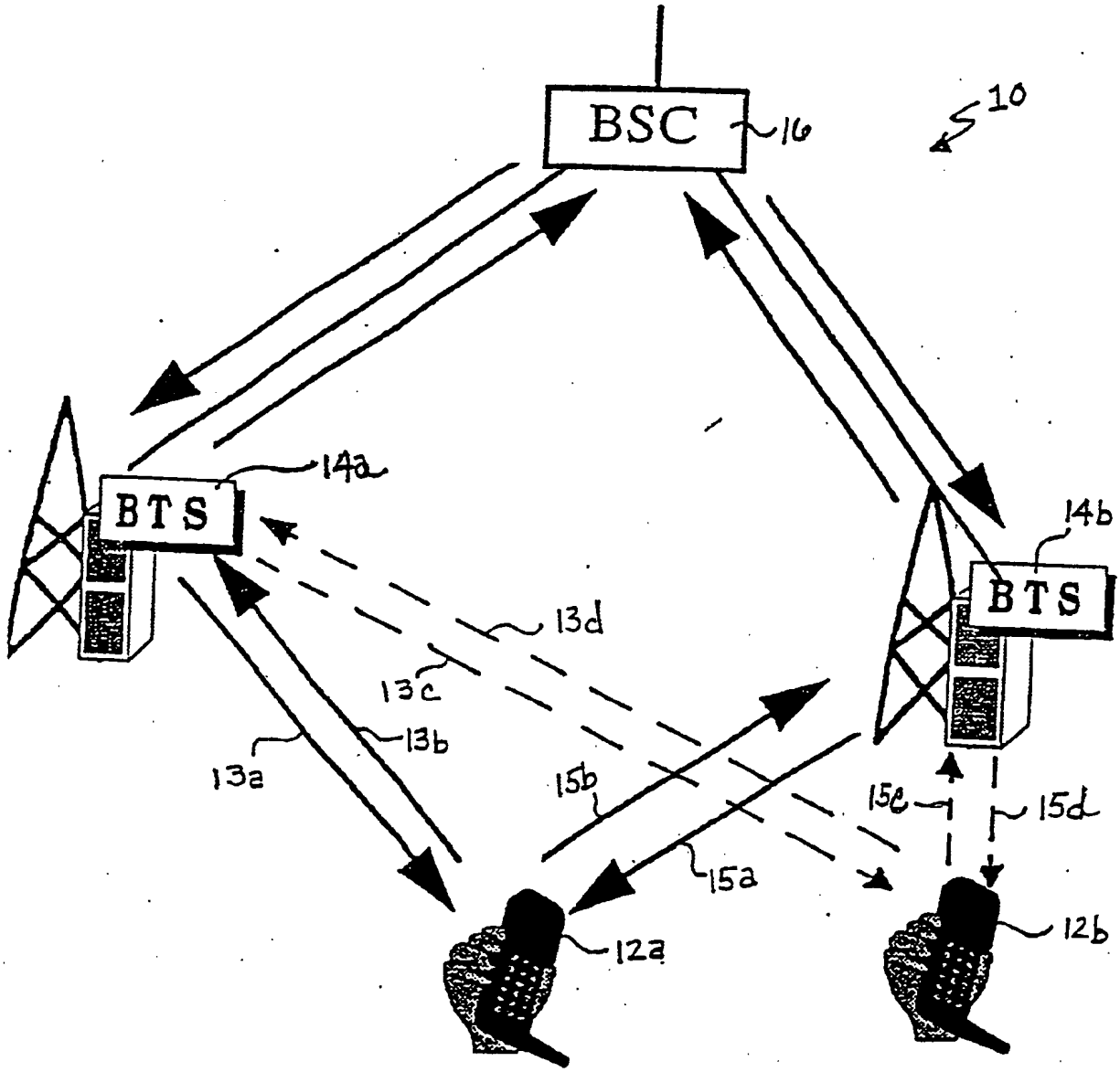



FIG. 1

09376373

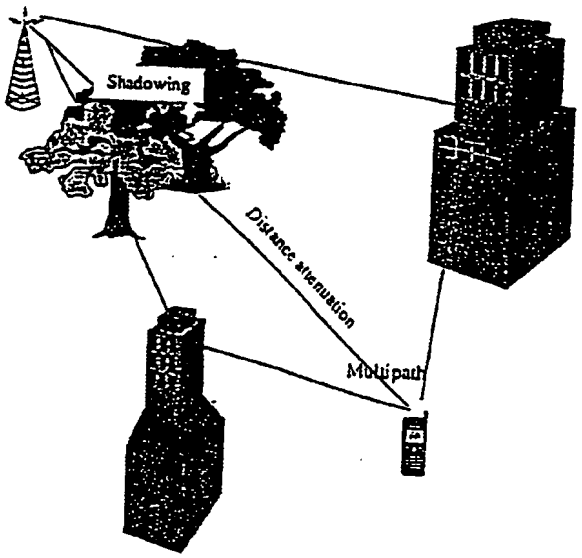



FIG. 2

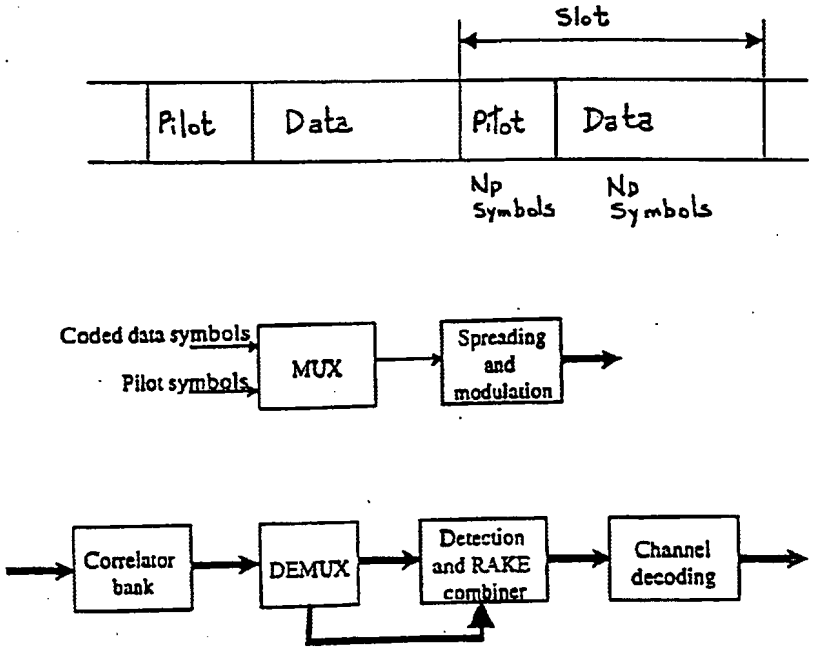



FIG. 3

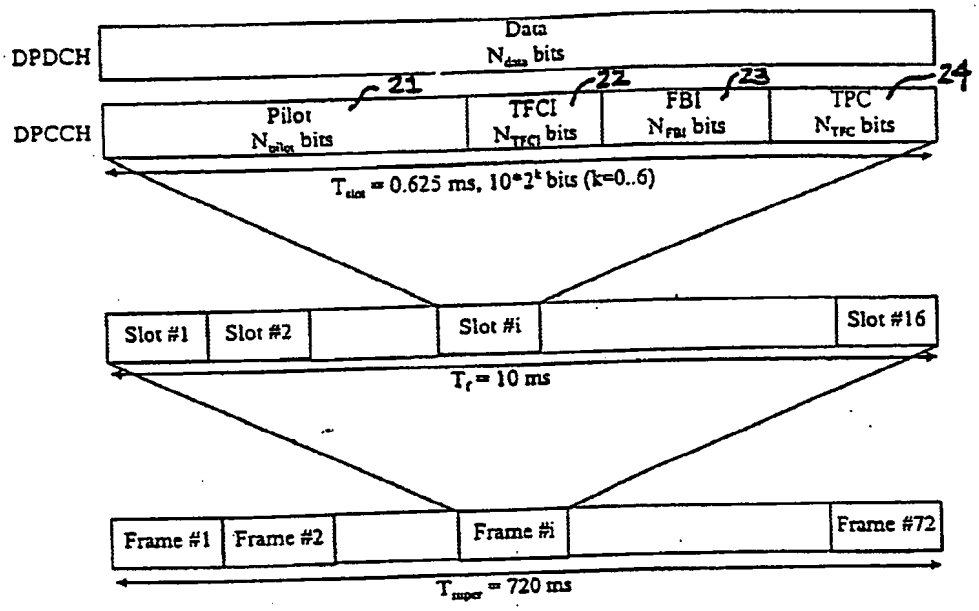



FIG. 4

| Channel Bit Rate (kbps) | Channel Symbol Rate (ksps) | SF | Bits/ Frame | Bits/ Slot | $N_{pilot}$ | $N_{TPC}$ | $N_{TFCI}$ | $N_{FBI}$ |
|---|---|---|---|---|---|---|---|---|
| 16 | 16 | 256 | 160 | 10 | 6 | 2 | 2 | 0 |
| 16 | 16 | 256 | 160 | 10 | 8 | 2 | 0 | 0 |
| 16 | 16 | 256 | 160 | 10 | 5 | 2 | 2 | 1 |
| 16 | 16 | 256 | 160 | 10 | 7 | 2 | 0 | 1 |
| 16 | 16 | 256 | 160 | 10 | [6] | [2] | [0] | [2] |
| 16 | 16 | 256 | 160 | 10 | [5] | [1] | [2] | [2] |

FIG. 5

| | $N_{pilot}$ = 6 | | | | | | $N_{pilot}$ = 8 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bit # | 0 | 1 | 2 | 3 | 4 | 5 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Slot #1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 |
| 3 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 |
| 4 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 |
| 5 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 |
| 6 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 |
| 7 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 |
| 8 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 |
| 9 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 |
| 10 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 |
| 11 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| 12 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 |
| 13 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 |
| 14 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 |
| 15 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 |
| 16 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |

FIG. 6

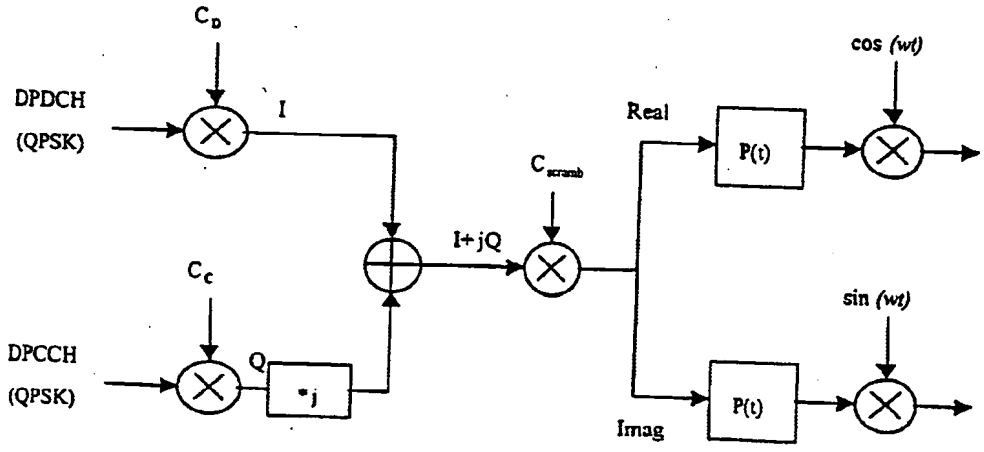



FIG. 7

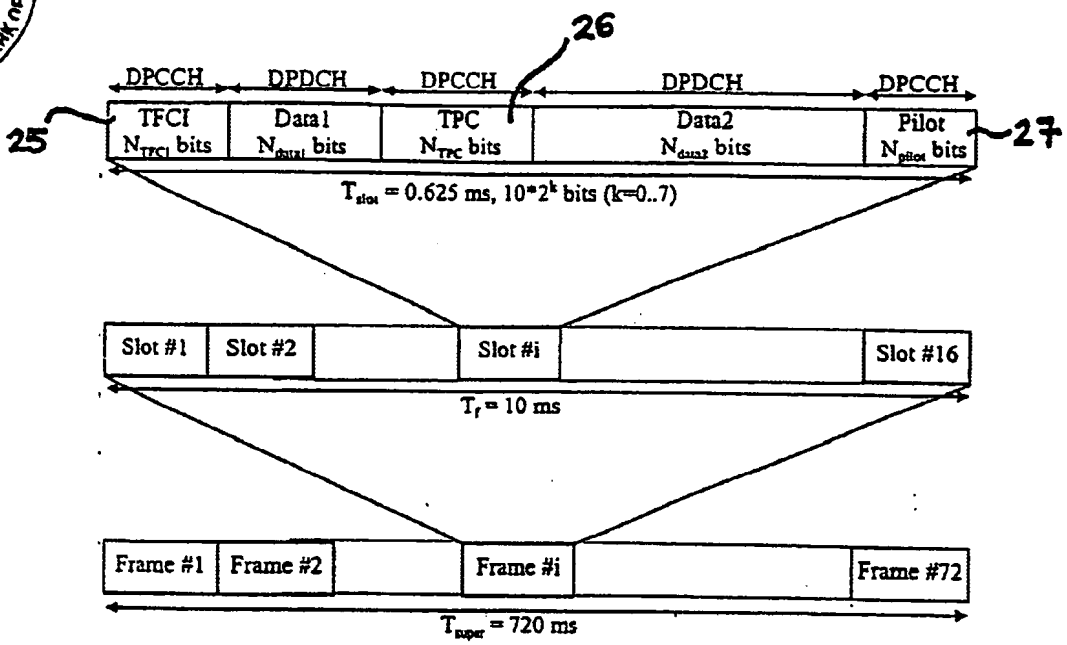
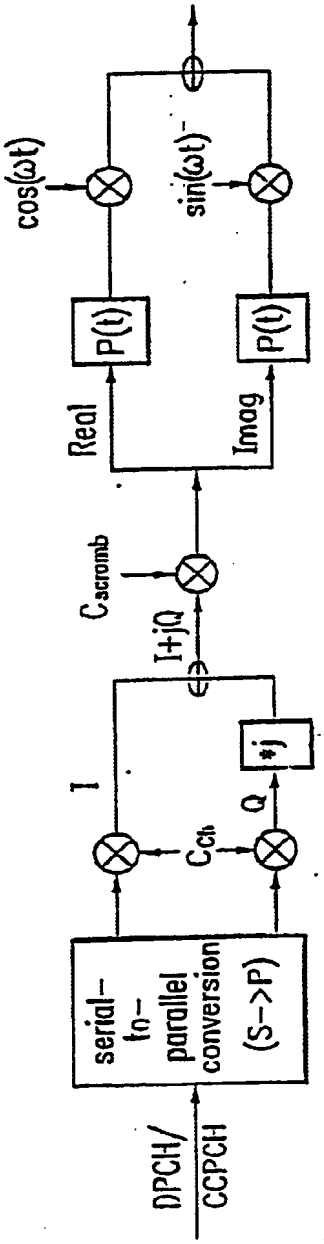



FIG. 8

| Symbol rate | 8ksps | | 16,32,64,128ksps | | | | 256,512,1024ksps | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Symbol # | 0 | 1 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Slot # 1 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 10 |
| 2 | 11 | 11 | 11 | 11 | 11 | 01 | 11 | 10 | 11 | 10 | 11 | 10 | 11 | 01 |
| 3 | 11 | 10 | 11 | 01 | 11 | 01 | 11 | 10 | 11 | 01 | 11 | 11 | 11 | 01 |
| 4 | 11 | 01 | 11 | 10 | 11 | 01 | 11 | 11 | 11 | 01 | 11 | 00 | 11 | 10 |
| 5 | 11 | 10 | 11 | 10 | 11 | 11 | 11 | 11 | 11 | 00 | 11 | 01 | 11 | 10 |
| 6 | 11 | 10 | 11 | 10 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 01 | 11 | 10 |
| 7 | 11 | 01 | 11 | 01 | 11 | 00 | 11 | 10 | 11 | 11 | 11 | 01 | 11 | 10 |
| 8 | 11 | 00 | 11 | 10 | 11 | 01 | 11 | 01 | 11 | 00 | 11 | 10 | 11 | 00 |
| 9 | 11 | 00 | 11 | 11 | 11 | 00 | 11 | 11 | 11 | 10 | 11 | 00 | 11 | 01 |
| 10 | 11 | 10 | 11 | 01 | 11 | 01 | 11 | 01 | 11 | 11 | 11 | 11 | 11 | 00 |
| 11 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 10 | 11 | 10 | 11 | 11 | 11 | 10 |
| 12 | 11 | 11 | 11 | 01 | 11 | 01 | 11 | 01 | 11 | 10 | 11 | 10 | 11 | 00 |
| 13 | 11 | 10 | 11 | 00 | 11 | 01 | 11 | 10 | 11 | 01 | 11 | 11 | 11 | 10 |
| 14 | 11 | 11 | 11 | 10 | 11 | 00 | 11 | 00 | 11 | 10 | 11 | 10 | 11 | 00 |
| 15 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 10 | 11 | 00 | 11 | 00 |
| 16 | 11 | 00 | 11 | 00 | 11 | 00 | 11 | 10 | 11 | 00 | 11 | 00 | 11 | 00 |

FIG. 9

FIG. 10



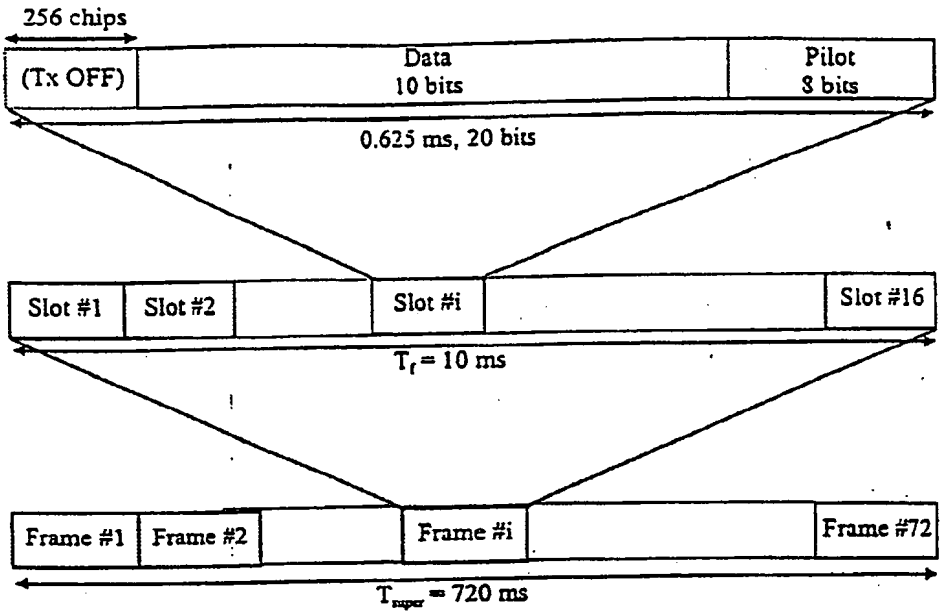



FIG. 11A

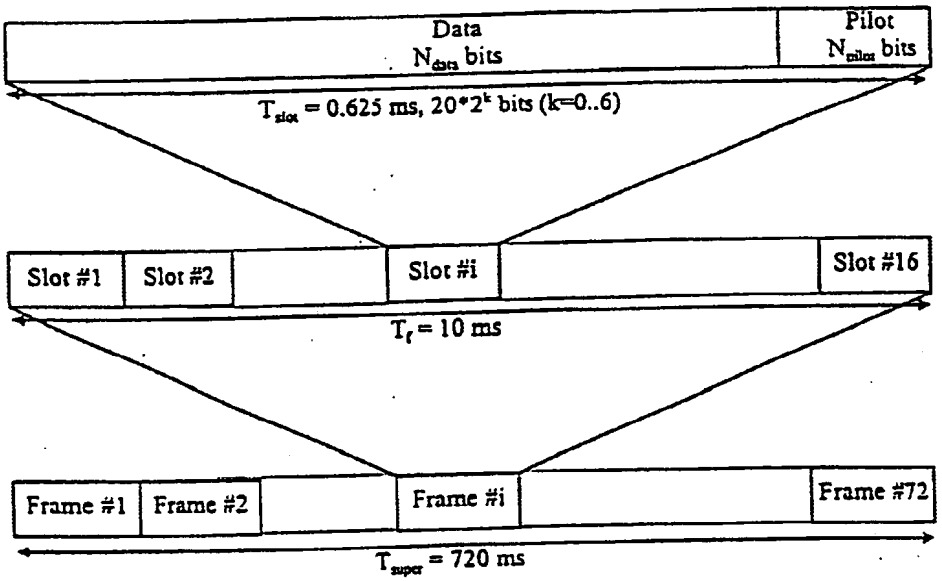



FIG. 11B

| Frame Synchronization Words |
|---|
| Slot Number 1 2 3 4 5 .....L |
| $C_1$ = (1 1 0 1 1 1 1 1 0 0 1 0 0 0 0 0) |
| $C_2$ = (1 0 0 0 1 0 1 0 0 1 1 1 0 1 0 1) |
| $C_3$ = (1 1 0 1 1 1 0 0 0 0 1 0 0 0 1 1) |
| $C_4$ = (0 1 1 1 0 1 1 0 1 0 0 0 1 0 0 1) |
| $C_5$ = (1 0 1 1 0 0 0 0 0 1 0 0 1 1 1 1) |
| $C_6$ = (1 1 1 0 0 1 0 1 0 0 0 1 1 0 1 0) |
| $C_7$ = (0 1 0 0 0 0 1 1 1 0 1 0 1 1 1 0 0) |
| $C_8$ = (1 1 1 0 1 0 0 1 0 0 0 1 0 1 1 0) |

FIG. 12A

| $R(\tau)$ $\tau$ | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $R_E(\tau)$ | 16 | 4 | 0 | 4 | 0 | -4 | 0 | -4 | -16 | -4 | 0 | -4 | 0 | 4 | 0 | 4 |
| $R_F(\tau)$ | 16 | -4 | 0 | -4 | 0 | 4 | 0 | 4 | -16 | 4 | 0 | 4 | 0 | -4 | 0 | -4 |
| $R_G(\tau)$ | 16 | 4 | 0 | -4 | 0 | 4 | 0 | -4 | -16 | -4 | 0 | 4 | 0 | -4 | 0 | 4 |
| $R_H(\tau)$ | 16 | -4 | 0 | 4 | 0 | -4 | 0 | 4 | -16 | 4 | 0 | -4 | 0 | 4 | 0 | -4 |

$R_1$ $R_2$

FIG. 12B

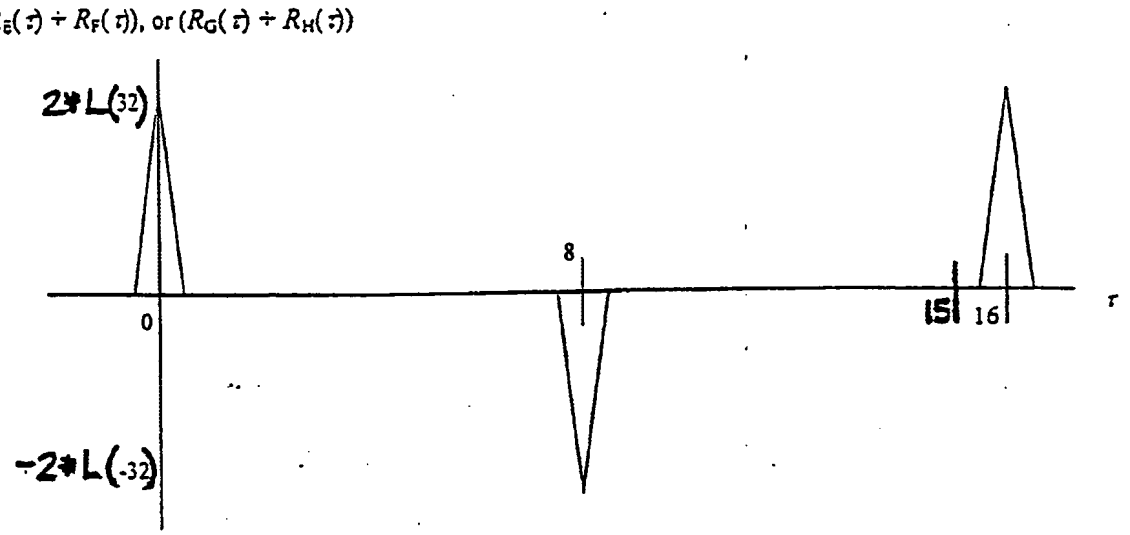



FIG. 13A

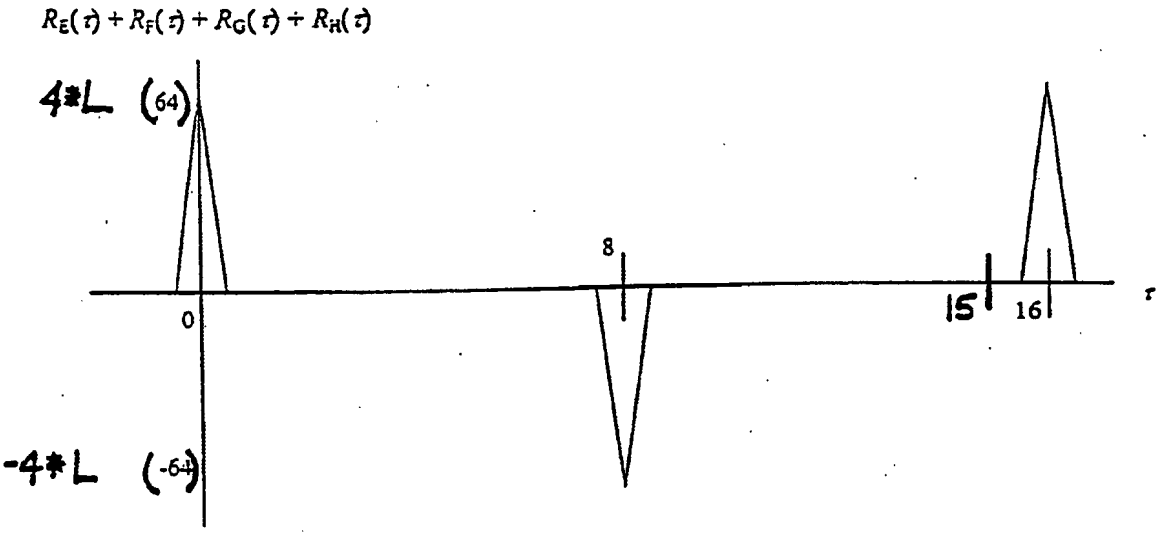



FIG. 13B

| | $N_{slot} = 5$ | | | | | $N_{slot} = 6$ | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Bit # | 0 | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 4 |
| Slot #1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0 |
| 2 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 |
| 3 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 |
| 4 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 |
| 5 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0 |
| 6 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 |
| 7 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 |
| 8 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 |
| 9 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 |
| 10 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 |
| 11 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0 |
| 12 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 |
| 13 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 |
| 14 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 |
| 15 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 |
| 16 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 |

FIG. 14A

| | $N_{pilot}=7$ | | | | | | | $N_{pilot}=8$ | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bit # | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Slot #1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| 2 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 |
| 3 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 |
| 4 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 |
| 5 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| 6 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 |
| 7 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 |
| 8 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 |
| 9 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 |
| 10 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 |
| 11 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0 |
| 12 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 |
| 13 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 |
| 14 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 |
| 15 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 0 |
| 16 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 |

FIG. 14B

| $N_{pilot}$ | Pilot bit position # | Corresponding word of length 16 |
|---|---|---|
| 5 | 0 | $C_1$ |
| | 1 | $C_2$ |
| | 3 | $C_3$ |
| | 4 | $C_4$ |
| 6 | 1 | $C_1$ |
| | 2 | $C_2$ |
| | 4 | $C_3$ |
| | 5 | $C_4$ |
| 7 | 1 | $C_1$ |
| | 2 | $C_2$ |
| | 4 | $C_3$ |
| | 5 | $C_4$ |
| 8 | 1 | $C_1$ |
| | 3 | $C_2$ |
| | 5 | $C_3$ |
| | 7 | $C_4$ |

FIG. 14C

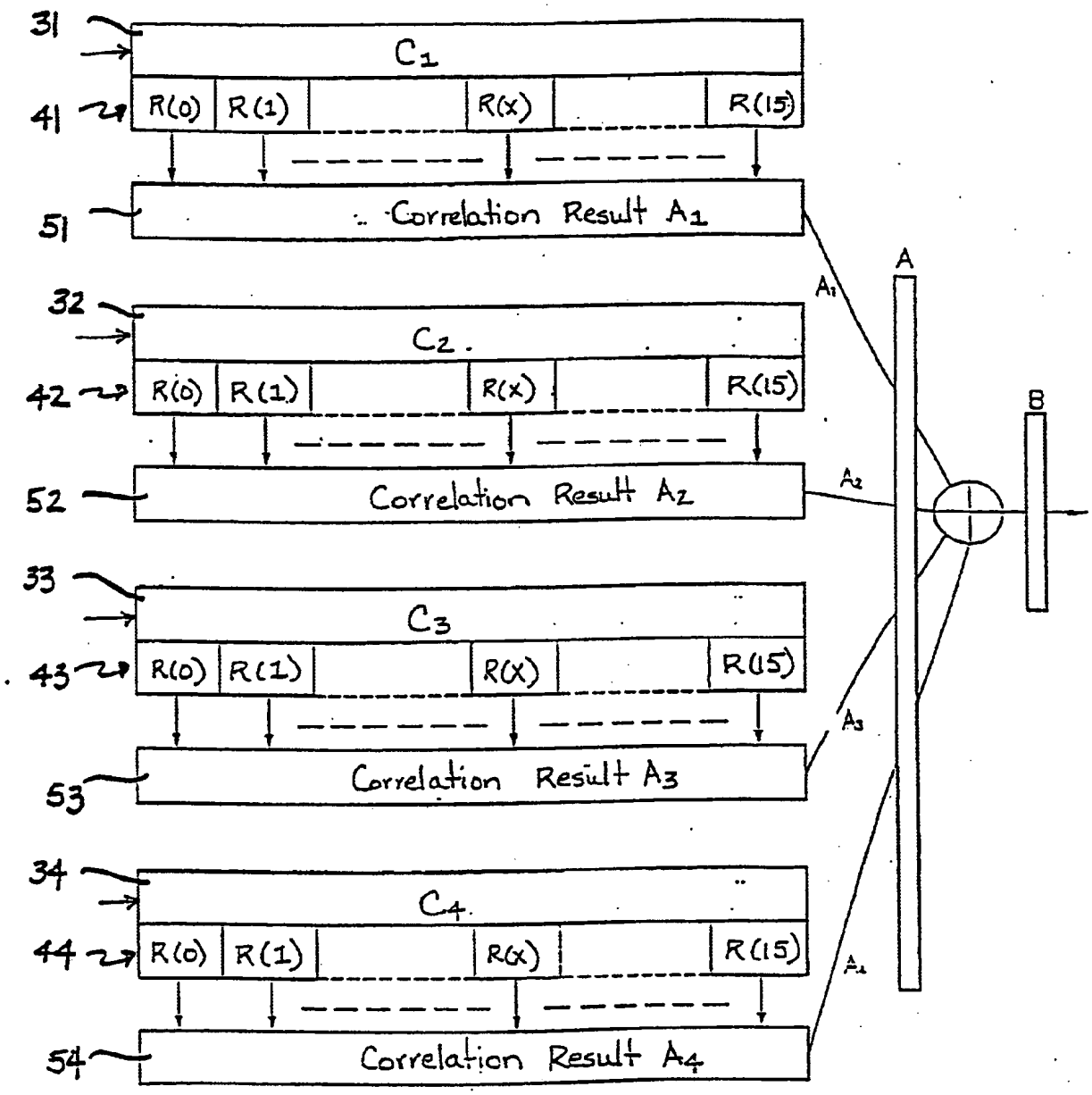



FIG. 14D

| | $R_x$ (0) | $R_x$ (1) | $R_x$ (2) | $R_x$ (3) | $R_x$ (4) | $R_x$ (5) | $R_x$ (6) | $R_x$ (7) | $R_x$ (8) | $R_x$ (9) | $R_x$ (10) | $R_x$ (11) | $R_x$ (12) | $R_x$ (13) | $R_x$ (14) | $R_x$ (15) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $A_1$ POINT | 16 | 4 | 0 | 4 | 0 | -4 | 0 | -4 | -16 | -4 | 0 | -4 | 0 | 4 | 0 | 4 |
| $A_2$ POINT | 16 | -4 | 0 | -4 | 0 | 4 | 0 | 4 | -16 | 4 | 0 | 4 | 0 | -4 | 0 | -4 |
| $A_3$ POINT | 16 | 4 | 0 | 4 | 0 | -4 | 0 | -4 | -16 | -4 | 0 | -4 | 0 | 4 | 0 | 4 |
| $A_4$ POINT | 16 | -4 | 0 | -4 | 0 | 4 | 0 | 4 | -16 | 4 | 0 | 4 | 0 | -4 | 0 | -4 |
| B POINT | 64 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -64 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

FIG. 14E

| | $R_x$ (0) | $R_x$ (1) | $R_x$ (2) | $R_x$ (3) | $R_x$ (4) | $R_x$ (5) | $R_x$ (6) | $R_x$ (7) | $R_x$ (8) | $R_x$ (9) | $R_x$ (10) | $R_x$ (11) | $R_x$ (12) | $R_x$ (13) | $R_x$ (14) | $R_x$ (15) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $A_1$ POINT $+A_2$ POINT | 32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| $A_3$ POINT $+A_4$ POINT | 32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| $A_1$ POINT $+A_4$ POINT | 32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| $A_2$ POINT $+$ $A_3$ POINT | 32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

FIG. 14F

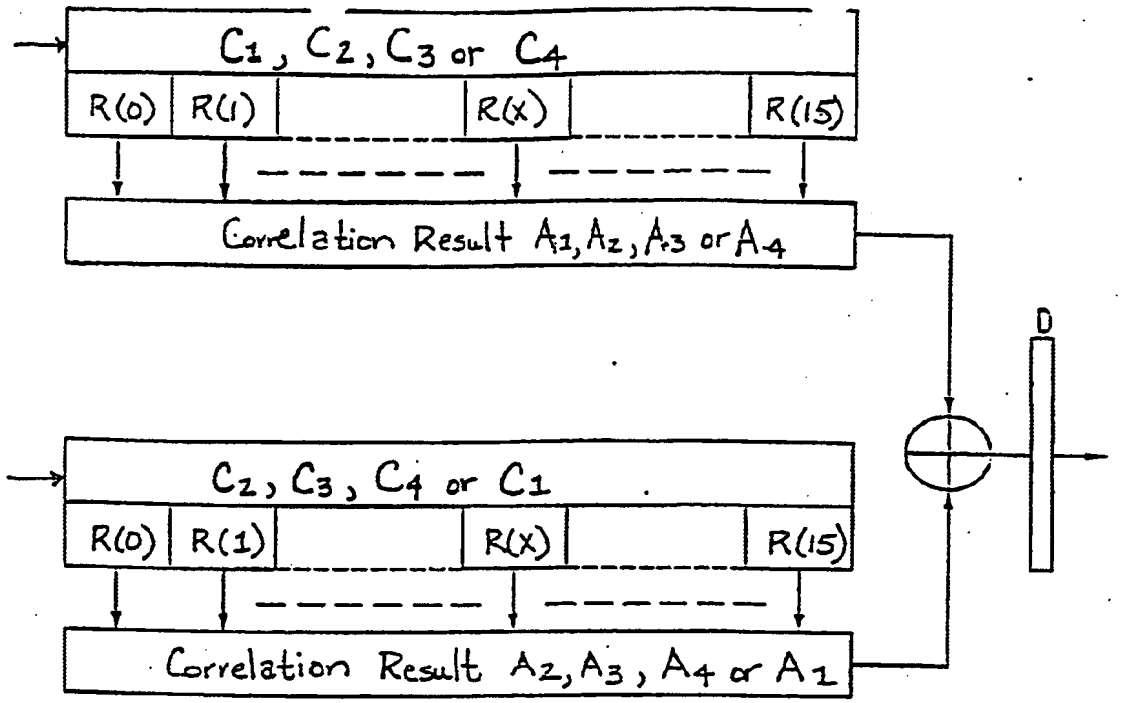



FIG. 14G

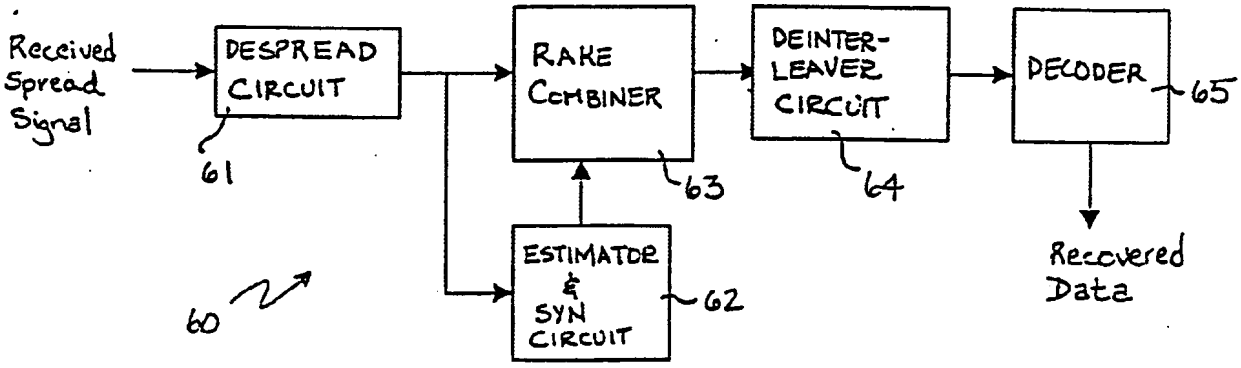



FIG. 14H

| | $R_x(0)$ | $R_x(1)$ | $R_x(2)$ | $R_x(3)$ | $R_x(4)$ | $R_x(5)$ | $R_x(6)$ | $R_x(7)$ | $R_x(8)$ | $R_x(9)$ | $R_x(10)$ | $R_x(11)$ | $R_x(12)$ | $R_x(13)$ | $R_x(14)$ | $R_x(15)$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $A_1$ POINT | 16 | -4 | -4 | 8 | 0 | -4 | 0 | 0 | -4 | 0 | 0 | -4 | 0 | 8 | -4 | -4 |
| $A_2$ POINT | 16 | 0 | 0 | -4 | -4 | -4 | 0 | 0 | 12 | 0 | 0 | -4 | -4 | -4 | 0 | 0 |
| $A_3$ POINT | 16 | 4 | 0 | 0 | 4 | 8 | 8 | 0 | 0 | 0 | 8 | 8 | 4 | 0 | 0 | 4 |
| $A_4$ POINT | 16 | 0 | 4 | -4 | 0 | 0 | -4 | 4 | 0 | 4 | -4 | 0 | 0 | -4 | 4 | 0 |
| B POINT | 64 | 0 | 0 | 0 | 0 | 0 | 4 | 4 | 8 | 4 | 4 | 0 | 0 | 0 | 0 | 0 |

FIG. 14I

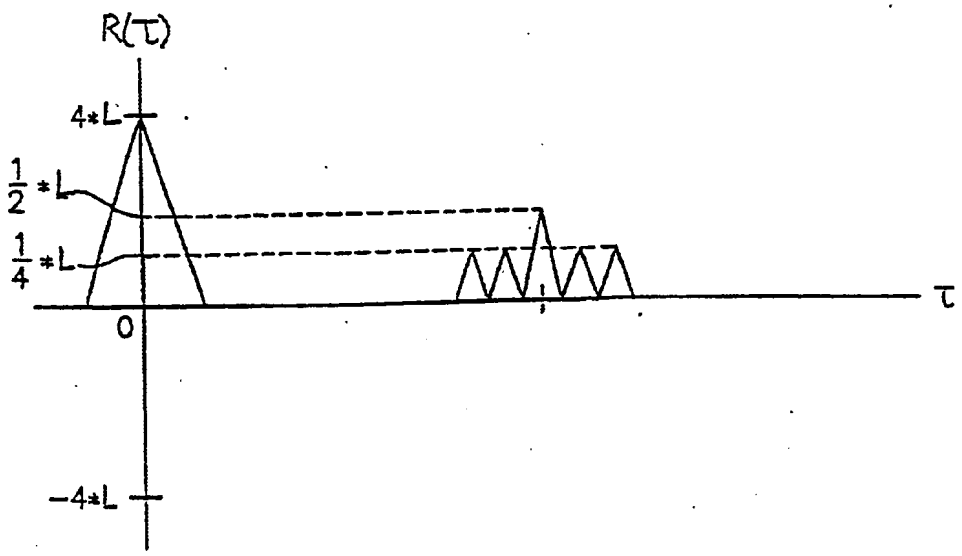



FIG. 14J

| | $N_{pi}$ | 4 | $N_{pilot}$ = 8 | | | | $N_{pilot}$ = 16 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Symbol # | 0 | 1 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Slot #1 | 11 | 11 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 01 |
| 2 | 11 | 10 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 01 | 11 | 11 |
| 3 | 11 | 00 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 11 | 11 | 01 |
| 4 | 11 | 10 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 00 |
| 5 | 11 | 11 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 00 | 11 | 01 |
| 6 | 11 | 10 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 01 | 11 | 00 |
| 7 | 11 | 11 | 11 | 11 | 11 | 01 | 11 | 11 | 11 | 01 | 11 | 00 | 11 | 10 |
| 8 | 11 | 10 | 11 | 10 | 11 | 00 | 11 | 10 | 11 | 00 | 11 | 01 | 11 | 11 |
| 9 | 11 | 00 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 10 |
| 10 | 11 | 01 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 10 | 11 | 00 |
| 11 | 11 | 11 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 00 | 11 | 10 |
| 12 | 11 | 01 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 11 |
| 13 | 11 | 00 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 11 | 11 | 10 |
| 14 | 11 | 01 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 10 | 11 | 11 |
| 15 | 11 | 00 | 11 | 00 | 11 | 10 | 11 | 00 | 11 | 10 | 11 | 11 | 11 | 01 |
| 16 | 11 | 01 | 11 | 01 | 11 | 11 | 11 | 01 | 11 | 11 | 11 | 10 | 11 | 00 |

FIG. 15A

| Symbol rate | Symbol # | Channel | Corresponding Word of length L=16 |
|---|---|---|---|
| $N_{pilot}$ = 4 | 1 | I-CH | $C_1$ |
| | | Q-CH | $C_2$ |
| $N_{pilot}$ = 8 | 1 | I-CH | $C_1$ |
| | | Q-CH | $C_2$ |
| | 3 | I-CH | $C_3$ |
| | | Q-CH | $C_4$ |
| $N_{pilot}$ = 16 | 1 | I-CH | $C_1$ |
| | | Q-CH | $C_2$ |
| | 3 | I-CH | $C_3$ |
| | | Q-CH | $C_4$ |
| | 5 | I-CH | $C_5$ |
| | | Q-CH | $C_6$ |
| | 7 | I-CH | $C_7$ |
| | | Q-CH | $C_8$ |

FIG. 15B

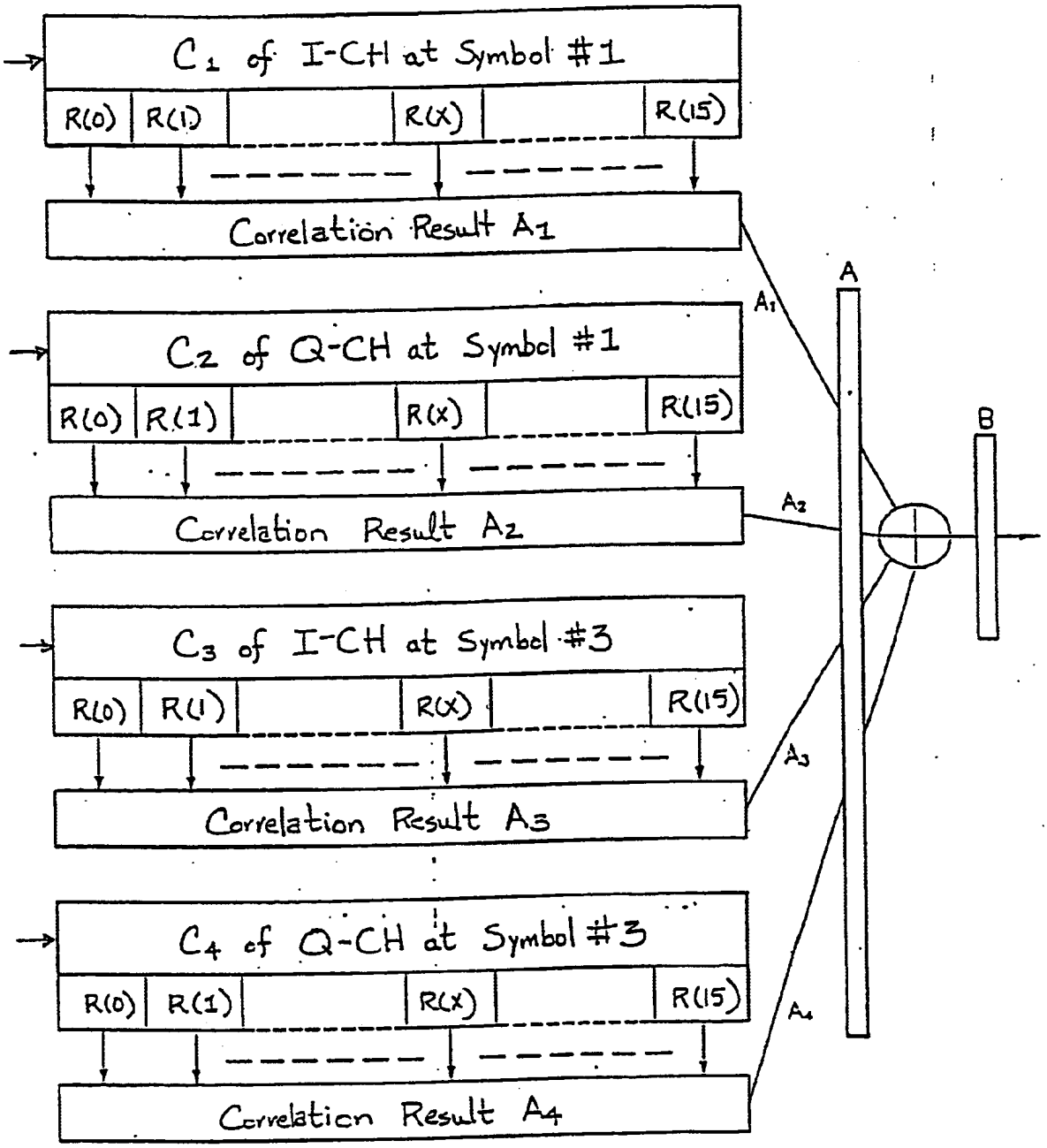



FIG. 15C

| Symbol # | 0 | 1 | 2 | 3 |
|---|---|---|---|---|
| Slot #1 | 11 | 11 | 11 | 10 |
| 2 | 11 | 10 | 11 | 11 |
| 3 | 11 | 00 | 11 | 01 |
| 4 | 11 | 10 | 11 | 11 |
| 5 | 11 | 11 | 11 | 10 |
| 6 | 11 | 10 | 11 | 11 |
| 7 | 11 | 11 | 11 | 01 |
| 8 | 11 | 10 | 11 | 00 |
| 9 | 11 | 00 | 11 | 01 |
| 10 | 11 | 01 | 11 | 00 |
| 11 | 11 | 11 | 11 | 10 |
| 12 | 11 | 01 | 11 | 00 |
| 13 | 11 | 00 | 11 | 01 |
| 14 | 11 | 01 | 11 | 00 |
| 15 | 11 | 00 | 11 | 10 |
| 16 | 11 | 01 | 11 | 11 |

FIG. 16A

| Symbol # | Channel | Corresponding word of length 16 |
|---|---|---|
| 1 | I-CH | $C_1$ |
| | Q-CH | $C_2$ |
| 3 | I-CH | $C_3$ |
| | Q-CH | $C_4$ |

FIG. 16B

| | $N_{pilot}$ = 8 | | | | $N_{pilot}$ = 1 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Symbol # | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Slot #1 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 01 |
| 2 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 01 | 11 | 11 |
| 3 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 11 | 11 | 01 |
| 4 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 00 |
| 5 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 00 | 11 | 01 |
| 6 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 01 | 11 | 00 |
| 7 | 11 | 11 | 11 | 01 | 11 | 11 | 11 | 01 | 11 | 00 | 11 | 10 |
| 8 | 11 | 10 | 11 | 00 | 11 | 10 | 11 | 00 | 11 | 01 | 11 | 11 |
| 9 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 10 |
| 10 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 10 | 11 | 00 |
| 11 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 00 | 11 | 10 |
| 12 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 11 |
| 13 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 11 | 11 | 10 |
| 14 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 10 | 11 | 11 |
| 15 | 11 | 00 | 11 | 10 | 11 | 00 | 11 | 10 | 11 | 11 | 11 | 01 |
| 16 | 11 | 01 | 11 | 11 | 11 | 01 | 11 | 11 | 11 | 10 | 11 | 00 |

FIG. 16C

| Symbol rate | Symbol # | Channel | Corresponding word of length 16 |
|---|---|---|---|
| $N_{pilot}$ = 8 | 1 | I-CH | $C_1$ |
| | | Q-CH | $C_2$ |
| | 3 | I-CH | $C_3$ |
| | | Q-CH | $C_4$ |
| $N_{pilot}$ = 16 | 1 | I-CH | $C_1$ |
| | | Q-CH | $C_2$ |
| | 3 | I-CH | $C_3$ |
| | | Q-CH | $C_4$ |
| | 5 | I-CH | $C_5$ |
| | | Q-CH | $C_6$ |
| | 7 | I-CH | $C_7$ |
| | | Q-CH | $C_8$ |

FIG. 16D

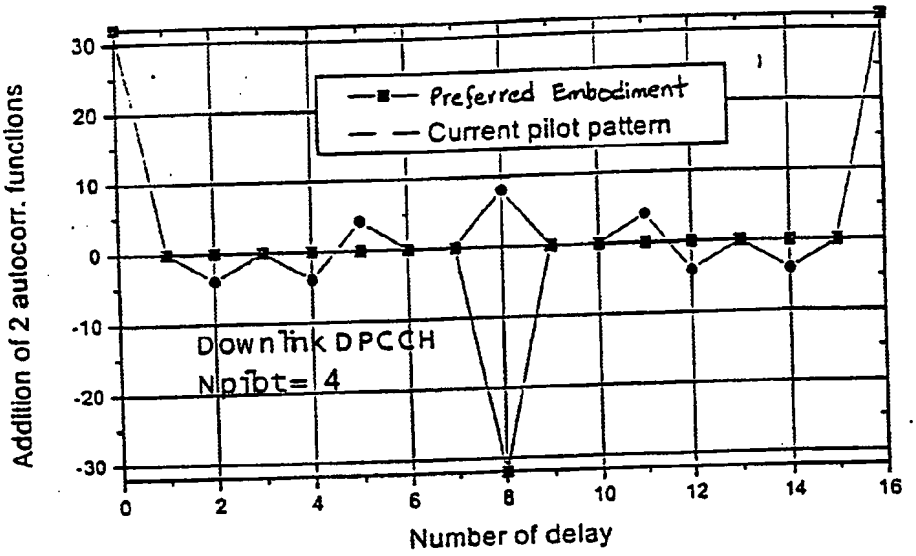



FIG. 17A

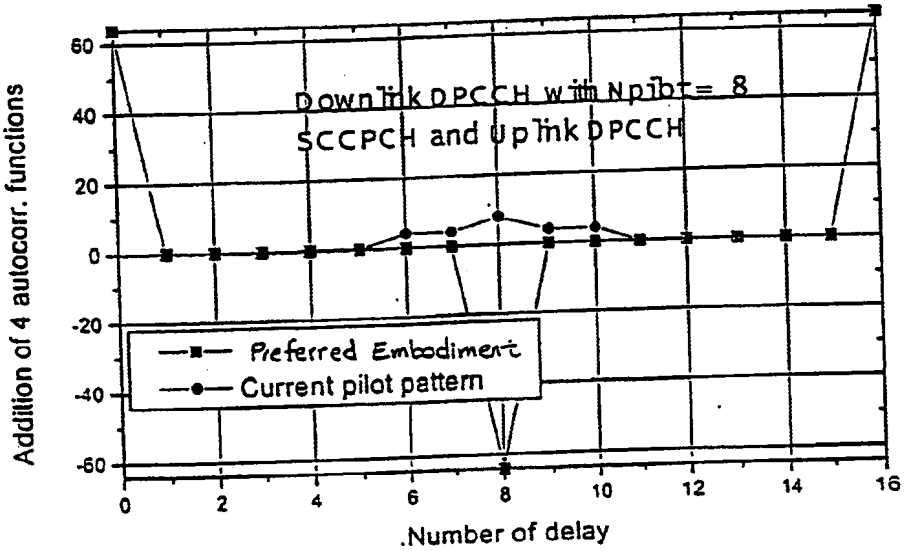



FIG. 17B

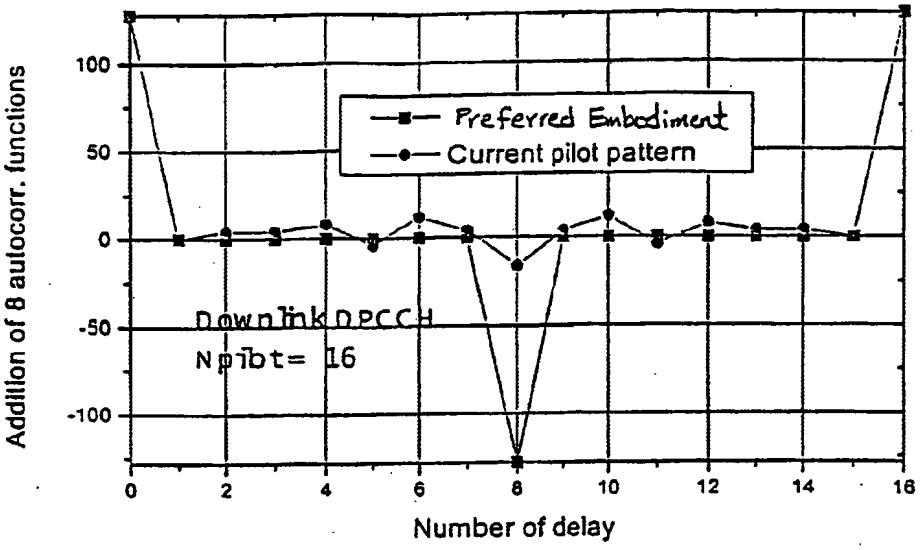



FIG. 17C

| Parameters | Downlink |
|---|---|
| Slot per frame | 16 |
| Number of bits in the DPCCH (Pilot/TPC/TFCI) | 4/2/0 |
| Number of bits in the DPDCH per each slot | 4 |
| Spreding factor (DPDCH) | 512 |
| Spreding factor (DPCCH) | 512 |
| Modulation | QPSK |
| 3dB bandwidth | 4.096MHz |
| Shaping filter | Root raised cosine (roll off 0.22) |
| Power amplifier | Ideal |
| Propogation channel | AWGN |

FIG. 18A

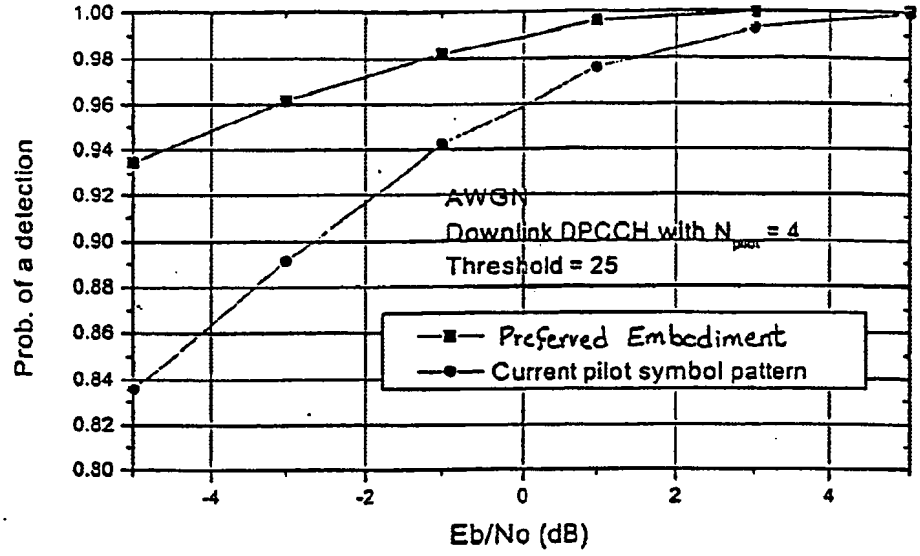



FIG. 18B

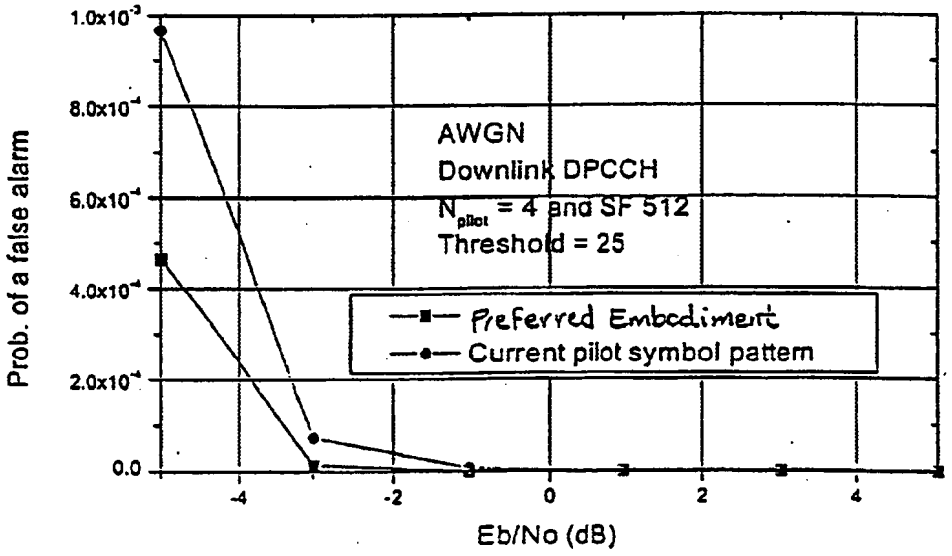



FIG. 18C

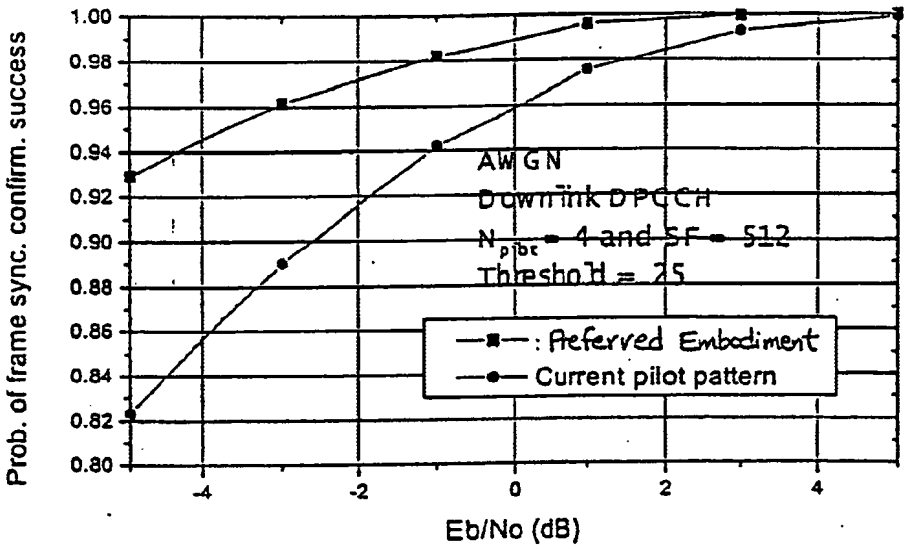



FIG. 18D

| | $N_{pilot}$ = | | $N_{pilot}$ = 8 | | | | $N_{pilot}$ = 16 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Symbol # | 0 | 1 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Slot #1 | 01 | 10 | 11 | 00 | 00 | 10 | 11 | 00 | 00 | 10 | 11 | 11 | 00 | 10 |
| 2 | 00 | 10 | 11 | 01 | 00 | 11 | 11 | 01 | 00 | 11 | 11 | 01 | 00 | 00 |
| 3 | 10 | 10 | 11 | 11 | 00 | 01 | 11 | 11 | 00 | 01 | 11 | 11 | 00 | 10 |
| 4 | 00 | 10 | 11 | 01 | 00 | 11 | 11 | 01 | 00 | 11 | 11 | 10 | 00 | 11 |
| 5 | 01 | 10 | 11 | 00 | 00 | 10 | 11 | 00 | 00 | 10 | 11 | 11 | 00 | 01 |
| 6 | 00 | 10 | 11 | 01 | 00 | 11 | 11 | 01 | 00 | 11 | 11 | 10 | 00 | 00 |
| 7 | 01 | 10 | 11 | 11 | 00 | 10 | 11 | 11 | 00 | 10 | 11 | 00 | 00 | 01 |
| 8 | 00 | 10 | 11 | 10 | 00 | 11 | 11 | 10 | 00 | 11 | 11 | 01 | 00 | 00 |
| 9 | 10 | 10 | 11 | 11 | 00 | 01 | 11 | 11 | 00 | 01 | 11 | 00 | 00 | 01 |
| 10 | 11 | 10 | 11 | 10 | 00 | 00 | 11 | 10 | 00 | 00 | 11 | 10 | 00 | 11 |
| 11 | 01 | 10 | 11 | 00 | 00 | 10 | 11 | 00 | 00 | 10 | 11 | 00 | 00 | 01 |
| 12 | 11 | 10 | 11 | 10 | 00 | 00 | 11 | 10 | 00 | 00 | 11 | 01 | 00 | 00 |
| 13 | 10 | 10 | 11 | 11 | 00 | 01 | 11 | 11 | 00 | 01 | 11 | 00 | 00 | 10 |
| 14 | 11 | 10 | 11 | 10 | 00 | 00 | 11 | 10 | 00 | 00 | 11 | 01 | 00 | 11 |
| 15 | 10 | 10 | 11 | 00 | 00 | 01 | 11 | 00 | 00 | 01 | 11 | 11 | 00 | 10 |
| 16 | 11 | 10 | 11 | 01 | 00 | 00 | 11 | 01 | 00 | 00 | 11 | 10 | 00 | 11 |

FIG. 19A

| Symbol rate | Symbol # | Channel | Corresponding Word of length 16 |
|---|---|---|---|
| $N_{pilot}$ = 4 | 0 | I-CH | $-C_1$ |
| | | Q-CH | $C_2$ |
| $N_{pilot}$ = 8 | 1 | I-CH | $-C_3$ |
| | | Q-CH | $C_4$ |
| | 3 | I-CH | $C_1$ |
| | | Q-CH | $-C_2$ |
| $N_{pilot}$ = 16 | 1 | I-CH | $-C_3$ |
| | | Q-CH | $C_4$ |
| | 3 | I-CH | $C_1$ |
| | | Q-CH | $-C_2$ |
| | 5 | I-CH | $-C_7$ |
| | | Q-CH | $C_8$ |
| | 7 | I-CH | $C_5$ |
| | | Q-CH | $-C_6$ |

FIG. 19B

| Symbol # | 0 | 1 | 2 | 3 |
|---|---|---|---|---|
| Slot #1 | 11 | 11 | 00 | 01 |
| 2 | 11 | 10 | 00 | 00 |
| 3 | 11 | 00 | 00 | 10 |
| 4 | 11 | 10 | 00 | 00 |
| 5 | 11 | 11 | 00 | 01 |
| 6 | 11 | 10 | 00 | 00 |
| 7 | 11 | 11 | 00 | 10 |
| 8 | 11 | 10 | 00 | 11 |
| 9 | 11 | 00 | 00 | 10 |
| 10 | 11 | 01 | 00 | 11 |
| 11 | 11 | 11 | 00 | 01 |
| 12 | 11 | 01 | 00 | 11 |
| 13 | 11 | 00 | 00 | 10 |
| 14 | 11 | 01 | 00 | 11 |
| 15 | 11 | 00 | 00 | 01 |
| 16 | 11 | 01 | 00 | 00 |

FIG. 19C

| Symbol # | Channel | Corresponding word of length 16 |
|---|---|---|
| 1 | I-CH | $C_1$ |
| | Q-CH | $C_2$ |
| 3 | I-CH | $-C_3$ |
| | Q-CH | $-C_4$ |

FIG. 19D

| | $N_{pilot} = 8$ | | | | $N_{pilot} = 16$ | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Symbol # | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Slot #1 | 11 | 00 | 00 | 10 | 11 | 00 | 00 | 10 | 11 | 11 | 00 | 10 |
| 2 | 11 | 01 | 00 | 11 | 11 | 01 | 00 | 11 | 11 | 01 | 00 | 00 |
| 3 | 11 | 11 | 00 | 01 | 11 | 11 | 00 | 01 | 11 | 11 | 00 | 10 |
| 4 | 11 | 01 | 00 | 11 | 11 | 01 | 00 | 11 | 11 | 10 | 00 | 11 |
| 5 | 11 | 00 | 00 | 10 | 11 | 00 | 00 | 10 | 11 | 11 | 00 | 01 |
| 6 | 11 | 01 | 00 | 11 | 11 | 01 | 00 | 11 | 11 | 10 | 00 | 00 |
| 7 | 11 | 11 | 00 | 10 | 11 | 11 | 00 | 10 | 11 | 00 | 00 | 01 |
| 8 | 11 | 10 | 00 | 11 | 11 | 10 | 00 | 11 | 11 | 01 | 00 | 00 |
| 9 | 11 | 11 | 00 | 01 | 11 | 11 | 00 | 01 | 11 | 00 | 00 | 01 |
| 10 | 11 | 10 | 00 | 00 | 11 | 10 | 00 | 00 | 11 | 10 | 00 | 11 |
| 11 | 11 | 00 | 00 | 10 | 11 | 00 | 00 | 10 | 11 | 00 | 00 | 01 |
| 12 | 11 | 10 | 00 | 00 | 11 | 10 | 00 | 00 | 11 | 01 | 00 | 00 |
| 13 | 11 | 11 | 00 | 01 | 11 | 11 | 00 | 01 | 11 | 00 | 00 | 10 |
| 14 | 11 | 10 | 00 | 00 | 11 | 10 | 00 | 00 | 11 | 01 | 00 | 11 |
| 15 | 11 | 00 | 00 | 01 | 11 | 00 | 00 | 01 | 11 | 11 | 00 | 10 |
| 16 | 11 | 01 | 00 | 00 | 11 | 01 | 00 | 00 | 11 | 10 | 00 | 11 |

FIG. 19E

| Symbol rate | Symbol # | Channel | Corresponding word of length 16 |
|---|---|---|---|
| $N_{pilot} = 8$ | 1 | I-CH | $-C_3$ |
| | | Q-CH | $C_4$ |
| | 3 | I-CH | $C_1$ |
| | | Q-CH | $-C_2$ |
| $N_{pilot} = 16$ | 1 | I-CH | $-C_3$ |
| | | Q-CH | $C_4$ |
| | 3 | I-CH | $C_1$ |
| | | Q-CH | $-C_2$ |
| | 5 | I-CH | $-C_7$ |
| | | Q-CH | $C_8$ |
| | 7 | I-CH | $C_5$ |
| | | Q-CH | $-C_6$ |

FIG. 19F

| Sequence | Autocorrelation |
|---|---|
| $C_1$=(1101111100100000) | 16 4 0 4 0 -4 0 -4 -16 -4 0 -4 0 4 0 4 |
| $C_2$=(1000101001110101) | 16 -4 0 -4 0 4 0 4 -16 4 0 4 0 -4 0 -4 |
| $C_3$=(1111101100000100) | 16 4 0 4 0 -4 0 -4 -16 -4 0 -4 0 4 0 4 |
| $C_4$=(0101000110101110) | 16 -4 0 -4 0 4 0 4 -16 4 0 4 0 -4 0 -4 |
| $C_5$=(0011101111000100) | 16 4 0 -4 0 4 0 -4 -16 -4 0 4 0 -4 0 4 |
| $C_6$=(0010010111011010) | 16 -4 0 4 0 -4 0 4 -16 4 0 -4 0 4 0 -4 |
| $C_7$=(0111000010001111) | 16 4 0 -4 0 4 0 -4 -16 -4 0 4 0 -4 0 4 |
| $C_8$=(1011101001000101) | 16 -4 0 4 0 -4 0 4 -16 4 0 -4 0 4 0 -4 |
| $C_9$=(0011011111001000) | 16 4 0 4 0 -4 0 -4 -16 -4 0 -4 0 4 0 4 |
| $C_{10}$=(0010100111010110) | 16 -4 0 -4 0 4 0 4 -16 4 0 4 0 -4 0 -4 |
| $C_{11}$=(1100000100111110) | 16 4 0 4 0 -4 0 -4 -16 -4 0 -4 0 4 0 4 |
| $C_{12}$=(1011100101000110) | 16 -4 0 -4 0 4 0 4 -16 4 0 4 0 -4 0 -4 |
| $C_{13}$=(0100001.110111100) | 16 4 0 -4 0 4 0 -4 -16 -4 0 4 0 -4 0 4 |
| $C_{14}$=(1000100101110110) | 16 -4 0 4 0 -4 0 4 -16 4 0 -4 0 4 0 -4 |
| $C_{15}$=(0000100011110111) | 16 4 0 -4 0 4 0 -4 -16 -4 0 4 0 -4 0 4 |
| $C_{16}$=(1001000101101110) | 16 -4 0 4 0 -4 0 4 -16 4 0 -4 0 4 0 -4 |

FIG. 20A

| $R(\tau)$ $\tau$ | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $R_E(\tau)$ | 16 | 4 | 0 | 4 | 0 | -4 | 0 | -4 | -16 | -4 | 0 | -4 | 0 | 4 | 0 | 4 |
| $R_F(\tau)$ | 16 | -4 | 0 | -4 | 0 | 4 | 0 | 4 | -16 | 4 | 0 | 4 | 0 | -4 | 0 | -4 |
| $R_G(\tau)$ | 16 | 4 | 0 | -4 | 0 | 4 | 0 | -4 | -16 | -4 | 0 | 4 | 0 | -4 | 0 | 4 |
| $R_H(\tau)$ | 16 | -4 | 0 | 4 | 0 | -4 | 0 | 4 | -16 | 4 | 0 | -4 | 0 | 4 | 0 | -4 |

FIG. 20B

| | $N_{pilot}$ = 6 | | | | | | $N_{pilot}$ = 8 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bit # | 0 | 1 | 2 | 3 | 4 | 5 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Slot #1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| 2 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 |
| 3 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 0 |
| 4 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 |
| 5 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| 6 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 |
| 7 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| 8 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 |
| 9 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 |
| 10 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 |
| 11 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 |
| 12 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 |
| 13 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 |
| 14 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| 15 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 |
| 16 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 |

FIG. 20C

| $N_{pilots}$ | Pilot bit position # | Corresponding word of length 16 |
|---|---|---|
| 6 | 1 | $C_1$ |
| | 2 | $C_2$ |
| | 4 | $C_3$ |
| | 5 | $C_4$ |
| 8 | 1 | $C_1$ |
| | 3 | $C_2$ |
| | 5 | $C_3$ |
| | 7 | $C_4$ |

FIG. 20D

| Symbol rate | 8ksps | | 16,32,64,128ksps | | | | 256,512,1024ksps | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Symbol # | 0 | 1 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Slot # 1 | 11 | 11 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 00 | 11 | 01 |
| 2 | 11 | 10 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 00 | 11 | 10 |
| 3 | 11 | 00 | 11 | 00 | 11 | 10 | 11 | 00 | 11 | 10 | 11 | 11 | 11 | 11 |
| 4 | 11 | 10 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 11 |
| 5 | 11 | 11 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 10 | 11 | 01 |
| 6 | 11 | 10 | 11 | 10 | 11 | 00 | 11 | 10 | 11 | 00 | 11 | 01 | 11 | 00 |
| 7 | 11 | 11 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 10 | 11 | 01 |
| 8 | 11 | 10 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 11 | 11 | 00 |
| 9 | 11 | 00 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 11 | 11 | 10 |
| 10 | 11 | 01 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 11 | 11 | 01 |
| 11 | 11 | 11 | 11 | 11 | 11 | 01 | 11 | 11 | 11 | 01 | 11 | 00 | 11 | 00 |
| 12 | 11 | 01 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 00 |
| 13 | 11 | 00 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 01 | 11 | 10 |
| 14 | 11 | 01 | 11 | 01 | 11 | 11 | 11 | 01 | 11 | 11 | 11 | 10 | 11 | 11 |
| 15 | 11 | 00 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 01 | 11 | 10 |
| 16 | 11 | 01 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 00 | 11 | 11 |

FIG. 20E

| Symbol rate | 2048,4096ksps | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Symbol # | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| Slot # 1 | 11 | 11 | 11 | 10 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 11 | 11 | 01 | 11 | 01 |
| 2 | 11 | 10 | 11 | 11 | 11 | 00 | 11 | 10 | 11 | 00 | 11 | 10 | 11 | 10 | 11 | 00 |
| 3 | 11 | 00 | 11 | 10 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 01 | 11 | 00 | 11 | 00 |
| 4 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 01 | 11 | 00 | 11 | 01 |
| 5 | 11 | 11 | 11 | 10 | 11 | 10 | 11 | 01 | 11 | 01 | 11 | 01 | 11 | 01 | 11 | 10 |
| 6 | 11 | 10 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 10 | 11 | 00 | 11 | 00 | 11 | 00 |
| 7 | 11 | 11 | 11 | 10 | 11 | 10 | 11 | 01 | 11 | 10 | 11 | 00 | 11 | 10 | 11 | 00 |
| 8 | 11 | 10 | 11 | 11 | 11 | 11 | 11 | 00 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 01 |
| 9 | 11 | 00 | 11 | 01 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 00 | 11 | 10 | 11 | 10 |
| 10 | 11 | 01 | 11 | 00 | 11 | 11 | 11 | 01 | 11 | 11 | 11 | 01 | 11 | 01 | 11 | 11 |
| 11 | 11 | 11 | 11 | 01 | 11 | 00 | 11 | 00 | 11 | 00 | 11 | 10 | 11 | 11 | 11 | 11 |
| 12 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 10 | 11 | 11 | 11 | 10 |
| 13 | 11 | 00 | 11 | 01 | 11 | 01 | 11 | 10 | 11 | 10 | 11 | 10 | 11 | 10 | 11 | 01 |
| 14 | 11 | 01 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 01 | 11 | 11 | 11 | 11 | 11 | 11 |
| 15 | 11 | 00 | 11 | 01 | 11 | 01 | 11 | 10 | 11 | 01 | 11 | 11 | 11 | 01 | 11 | 11 |
| 16 | 11 | 01 | 11 | 00 | 11 | 00 | 11 | 11 | 11 | 00 | 11 | 00 | 11 | 00 | 11 | 10 |

FIG. 20F

| Symbol rate | Symbol # | Channel | Corresponding word : of length 16 |
|---|---|---|---|
| 8ksps | 1 | I-CH | $C_1$ |
| | | Q-CH | $C_2$ |
| 16, 32, 64, 128ksps | 1 | I-CH | $C_1$ |
| | | Q-CH | $C_2$ |
| | 3 | I-CH | $C_3$ |
| | | Q-CH | $C_4$ |
| 256, 512, 1024ksps | 1 | I-CH | $C_1$ |
| | | Q-CH | $C_2$ |
| | 3 | I-CH | $C_3$ |
| | | Q-CH | $C_4$ |
| | 5 | I-CH | $C_5$ |
| | | Q-CH | $C_6$ |
| | 7 | I-CH | $C_7$ |
| | | Q-CH | $C_8$ |
| 2048, 4096ksps | 1 | I-CH | $C_1$ |
| | | Q-CH | $C_2$ |
| | 3 | I-CH | $C_3$ |
| | | Q-CH | $C_4$ |
| | 5 | I-CH | $C_5$ |
| | | Q-CH | $C_6$ |
| | 7 | I-CH | $C_7$ |
| | | Q-CH | $C_8$ |
| | 9 | I-CH | $C_9$ |
| | | Q-CH | $C_{10}$ |
| | 11 | I-CH | $C_{11}$ |
| | | Q-CH | $C_{12}$ |
| | 13 | I-CH | $C_{13}$ |
| | | Q-CH | $C_{14}$ |
| | 15 | I-CH | $C_{15}$ |
| | | Q-CH | $C_{16}$ |

FIG. 20G

| Symbol # | 0 | 1 | 2 | 3 |
|---|---|---|---|---|
| Slot #1 | 11 | 11 | 11 | 10 |
| 2 | 11 | 10 | 11 | 11 |
| 3 | 11 | 00 | 11 | 10 |
| 4 | 11 | 10 | 11 | 11 |
| 5 | 11 | 11 | 11 | 10 |
| 6 | 11 | 10 | 11 | 00 |
| 7 | 11 | 11 | 11 | 10 |
| 8 | 11 | 10 | 11 | 11 |
| 9 | 11 | 00 | 11 | 01 |
| 10 | 11 | 01 | 11 | 00 |
| 11 | 11 | 11 | 11 | 01 |
| 12 | 11 | 01 | 11 | 00 |
| 13 | 11 | 00 | 11 | 01 |
| 14 | 11 | 01 | 11 | 11 |
| 15 | 11 | 00 | 11 | 01 |
| 16 | 11 | 01 | 11 | 00 |

FIG. 20H

| Symbol # | Channel | Corresponding word of length 16 |
|---|---|---|
| 1 | I-CH | $C_1$ |
| | Q-CH | $C_2$ |
| 3 | I-CH | $C_3$ |
| | Q-CH | $C_4$ |

FIG. 20I

| Frame Synchronization Words |
|---|
| L=15, Slot No. 1 2 3 4.....15 |
| $C_1$=(1 0 0 0 1 1 1 1 0 1 0 1 1 0 0) |
| $C_2$=(1 0 1 0 0 1 1 0 1 1 1 0 0 0 0) |
| $C_3$=(1 1 0 0 0 1 0 0 1 1 0 1 0 1 1) |
| $C_4$=(0 0 1 0 1 0 0 0 0 1 1 1 0 1 1) |
| $C_5$=(1 1 1 0 1 0 1 1 0 0 1 0 0 0 1) |
| $C_6$=(1 1 0 1 1 1 0 0 0 0 1 0 1 0 0) |
| $C_7$=(1 0 0 1 1 0 1 0 1 1 1 1 0 0 0) |
| $C_8$=(0 0 0 0 0 1 1 1 0 1 1 0 0 1 0 1) |

FIG. 21

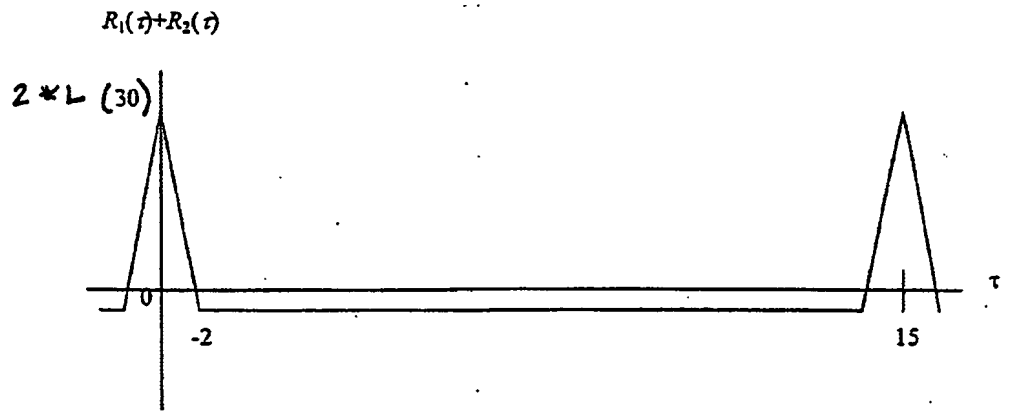



FIG. 22A

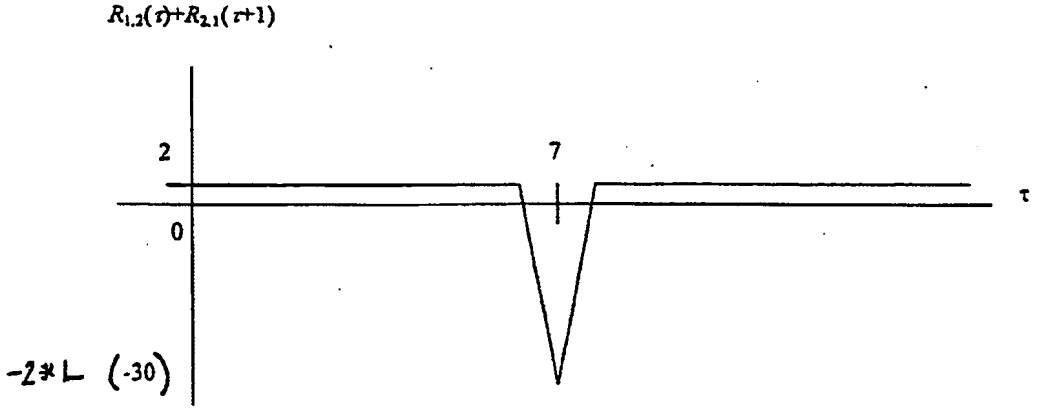



FIG. 22B

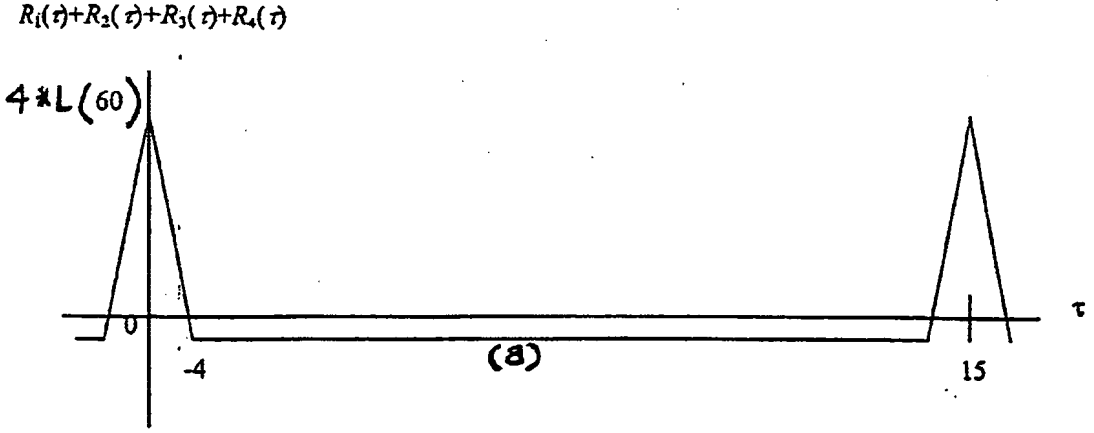



FIG. 22C

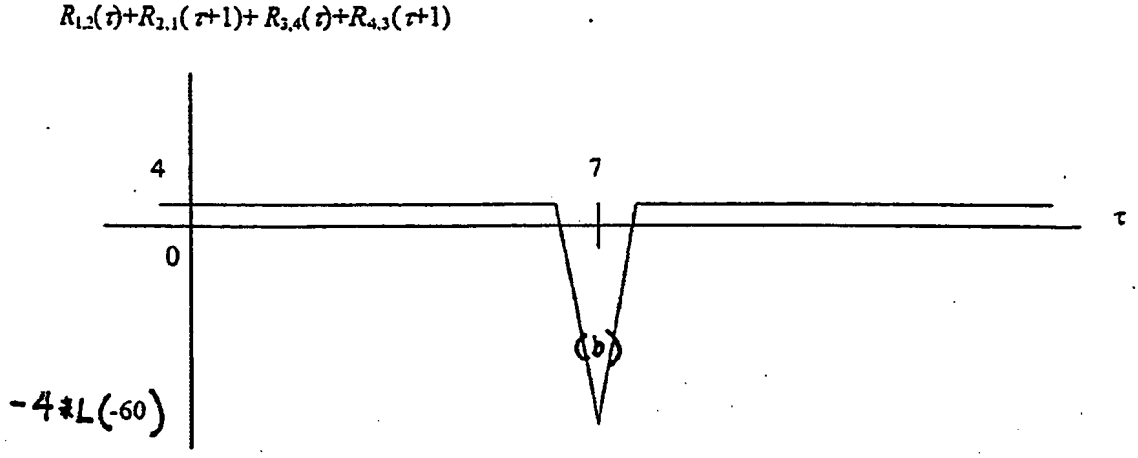



FIG. 22D

| | $N_{pilot}$=2 | | $N_{pilot}$=3 | | | $N_{pilot}$=4 | | | |
|---|---|---|---|---|---|---|---|---|---|
| Bit # | 0 | 1 | 0 | 1 | 2 | 0 | 1 | 2 | 3 |
| Slot #1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| 3 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 |
| 4 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| 5 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 |
| 6 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 7 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 8 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 |
| 9 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 |
| 10 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 11 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 |
| 12 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 |
| 13 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 |
| 14 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| 15 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |

FIG. 23A

| $N_{pilot}$ | Pilot bit position # | Corresponding word of length 15 |
|---|---|---|
| 2 | 0 | $C_1$ |
| | 1 | $C_2$ |
| 3 | 0 | $C_1$ |
| | 2 | $C_2$ |
| 4 | 1 | $C_1$ |
| | 3 | $C_2$ |

FIG. 23B

| | $N_{pilot}$=2 | | $N_{pilot}$=3 | | | $N_{pilot}$=4 | | | |
|---|---|---|---|---|---|---|---|---|---|
| Bit # | 0 | 1 | 0 | 1 | 2 | 0 | 1 | 2 | 3 |
| Slot #1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| 3 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 |
| 4 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| 5 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 |
| 6 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 7 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 8 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 |
| 9 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 |
| 10 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 11 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 |
| 12 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 |
| 13 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 |
| 14 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| 15 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |

FIG. 23C

| $N_{pilot}$ | Pilot bit position # | Corresponding word of length 15 |
|---|---|---|
| 2 | 1 | $C_1$ |
| 3 | 0 | $C_1$ |
| | 2 | $C_2$ |
| 4 | 1 | $C_1$ |
| | 3 | $C_2$ |

FIG. 23D

# FIG. 23E

| | $N_{pilot} = 5$ | | | | | $N_{pilot} = 6$ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Bit # | 0 | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 4 | 5 |
| Slot #1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 |
| 2 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 0 |
| 3 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 |
| 4 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 5 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 1 |
| 6 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 0 |
| 7 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 |
| 8 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 |
| 9 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 0 |
| 10 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 11 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 |
| 12 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 |
| 13 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 |
| 14 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 |
| 15 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 |

| | $N_{pilot} = 7$ | | | | | | | $N_{pilot} = 8$ | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bit # | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Slot #1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| 2 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 0 |
| 3 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 |
| 4 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| 5 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 |
| 6 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| 7 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 |
| 8 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 |
| 9 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 |
| 10 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 11 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 |
| 12 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 |
| 13 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 |
| 14 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 |
| 15 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 |

# FIG. 23F

| $N_{pilot}$ | Pilot bit position # | Corresponding word of length 15 |
|---|---|---|
| 5 | 0 | $C_1$ |
| | 1 | $C_2$ |
| | 3 | $C_3$ |
| | 4 | $C_4$ |
| 6 | 1 | $C_1$ |
| | 2 | $C_2$ |
| | 4 | $C_3$ |
| | 5 | $C_4$ |
| 7 | 1 | $C_1$ |
| | 2 | $C_2$ |
| | 4 | $C_3$ |
| | 5 | $C_4$ |
| 8 | 1 | $C_1$ |
| | 3 | $C_2$ |
| | 5 | $C_3$ |
| | 7 | $C_4$ |

FIG. 23G

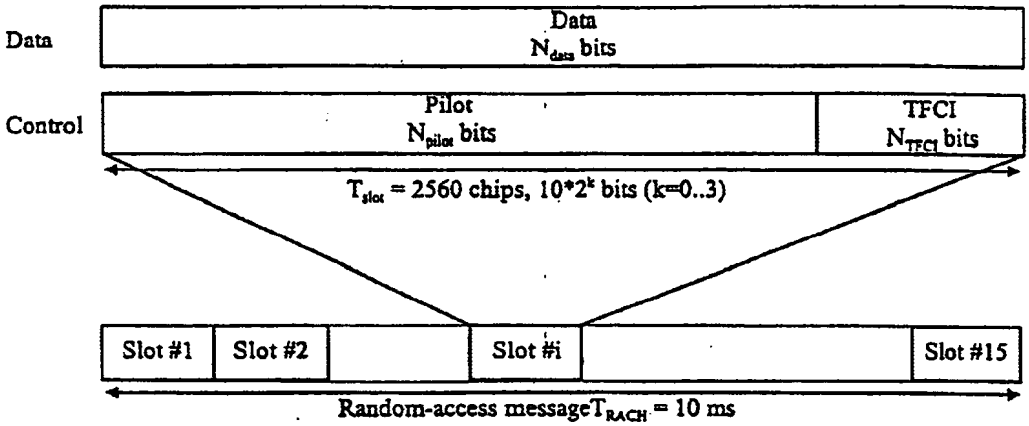



FIG. 23H

| Channel Bit Rate (kbps) | Channel Symbol Rate (ksps) | SF | Bits/ Frame | Bits/ Slot | $N_{pilot}$ | $N_{TFCI}$ |
|---|---|---|---|---|---|---|
| 15 | 15 | 256 | 150 | 10 | 8 | 2 |

FIG. 23I

| Bit # | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
| Slot #1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| 2 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 0 |
| 3 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 |
| 4 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| 5 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 |
| 6 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| 7 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 |
| 8 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 |
| 9 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 |
| 10 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 11 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 |
| 12 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 |
| 13 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 |
| 14 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 |
| 15 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 |

FIG. 23J

| | $N_{pilot}$=2 | $N_{pilot}$ = 4 | | $N_{pilot}$ = 8 | | | | $N_{pilot}$ = 16 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Symbol # | 0 | 0 | 1 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Slot #1 | 11 | 11 | 11 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 10 |
| 2 | 00 | 11 | 00 | 11 | 00 | 11 | 10 | 11 | 00 | 11 | 10 | 11 | 11 | 11 | 00 |
| 3 | 01 | 11 | 01 | 11 | 01 | 11 | 01 | 11 | 01 | 11 | 01 | 11 | 10 | 11 | 00 |
| 4 | 00 | 11 | 00 | 11 | 00 | 11 | 00 | 11 | 00 | 11 | 00 | 11 | 01 | 11 | 10 |
| 5 | 10 | 11 | 10 | 11 | 10 | 11 | 01 | 11 | 10 | 11 | 01 | 11 | 11 | 11 | 11 |
| 6 | 11 | 11 | 11 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 01 | 11 | 01 |
| 7 | 11 | 11 | 11 | 11 | 11 | 11 | 00 | 11 | 11 | 11 | 00 | 11 | 10 | 11 | 11 |
| 8 | 10 | 11 | 10 | 11 | 10 | 11 | 00 | 11 | 10 | 11 | 00 | 11 | 10 | 11 | 00 |
| 9 | 01 | 11 | 01 | 11 | 01 | 11 | 10 | 11 | 01 | 11 | 10 | 11 | 00 | 11 | 11 |
| 10 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 00 | 11 | 11 |
| 11 | 01 | 11 | 01 | 11 | 01 | 11 | 01 | 11 | 01 | 11 | 01 | 11 | 11 | 11 | 10 |
| 12 | 10 | 11 | 10 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 00 | 11 | 10 |
| 13 | 10 | 11 | 10 | 11 | 10 | 11 | 00 | 11 | 10 | 11 | 00 | 11 | 01 | 11 | 01 |
| 14 | 00 | 11 | 00 | 11 | 00 | 11 | 11 | 11 | 00 | 11 | 11 | 11 | 00 | 11 | 00 |
| 15 | 00 | 11 | 00 | 11 | 00 | 11 | 11 | 11 | 00 | 11 | 11 | 11 | 10 | 11 | 01 |

FIG. 24A

| Symbol rate | Symbol # | Channel | Corresponding word of length 15 |
|---|---|---|---|
| $N_{pilot}$ = 2 | 0 | I-CH | $C_1$ |
| | | Q-CH | $C_2$ |
| $N_{pilot}$ = 4 | 1 | I-CH | $C_1$ |
| | | Q-CH | $C_2$ |
| $N_{pilot}$ = 8 | 1 | I-CH | $C_1$ |
| | | Q-CH | $C_3$ |
| | 3 | I-CH | $C_3$ |
| | | Q-CH | $C_4$ |
| $N_{pilot}$ = 16 | 1 | I-CH | $C_1$ |
| | | Q-CH | $C_2$ |
| | 3 | I-CH | $C_3$ |
| | | Q-CH | $C_4$ |
| | 5 | I-CH | $C_5$ |
| | | Q-CH | $C_6$ |
| | 7 | I-CH | $C_7$ |
| | | Q-CH | $C_8$ |

FIG. 24B

| | $N_{pilot} = 4$ | | $N_{pilot} = 8$ | | | | $N_{pilot} = 16$ | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Symbol # | 0 | 1 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Slot #1 | 01 | 10 | 11 | 00 | 00 | 10 | 11 | 00 | 00 | 10 | 11 | 00 | 00 | 10 |
| 2 | 10 | 10 | 11 | 00 | 00 | 01 | 11 | 00 | 00 | 01 | 11 | 10 | 00 | 10 |
| 3 | 11 | 10 | 11 | 11 | 00 | 00 | 11 | 11 | 00 | 00 | 11 | 10 | 00 | 11 |
| 4 | 10 | 10 | 11 | 10 | 00 | 01 | 11 | 10 | 00 | 01 | 11 | 00 | 00 | 00 |
| 5 | 00 | 10 | 11 | 11 | 00 | 11 | 11 | 11 | 00 | 11 | 11 | 01 | 00 | 10 |
| 6 | 01 | 10 | 11 | 00 | 00 | 10 | 11 | 00 | 00 | 10 | 11 | 11 | 00 | 00 |
| 7 | 01 | 10 | 11 | 10 | 00 | 10 | 11 | 10 | 00 | 10 | 11 | 01 | 00 | 11 |
| 8 | 00 | 10 | 11 | 10 | 00 | 11 | 11 | 10 | 00 | 11 | 11 | 10 | 00 | 11 |
| 9 | 11 | 10 | 11 | 00 | 00 | 00 | 11 | 00 | 00 | 00 | 11 | 01 | 00 | 01 |
| 10 | 01 | 10 | 11 | 01 | 00 | 10 | 11 | 01 | 00 | 10 | 11 | 01 | 00 | 01 |
| 11 | 11 | 10 | 11 | 11 | 00 | 00 | 11 | 11 | 00 | 00 | 11 | 00 | 00 | 10 |
| 12 | 00 | 10 | 11 | 01 | 00 | 11 | 11 | 01 | 00 | 11 | 11 | 00 | 00 | 01 |
| 13 | 00 | 10 | 11 | 10 | 00 | 11 | 11 | 10 | 00 | 11 | 11 | 11 | 00 | 00 |
| 14 | 10 | 10 | 11 | 01 | 00 | 01 | 11 | 01 | 00 | 01 | 11 | 10 | 00 | 01 |
| 15 | 10 | 10 | 11 | 01 | 00 | 01 | 11 | 01 | 00 | 01 | 11 | 11 | 00 | 11 |

FIG. 24C

| Symbol rate | Symbol # | Channel | Corresponding word of length 15 |
|---|---|---|---|
| $N_{pilot} = 4$ | 0 | I-CH | $-C_1$ |
| | | Q-CH | $C_2$ |
| $N_{pilot} = 8$ | 1 | I-CH | $-C_3$ |
| | | Q-CH | $C_4$ |
| | 3 | I-CH | $C_1$ |
| | | Q-CH | $-C_2$ |
| $N_{pilot} = 16$ | 1 | I-CH | $-C_3$ |
| | | Q-CH | $C_4$ |
| | 3 | I-CH | $C_1$ |
| | | Q-CH | $-C_2$ |
| | 5 | I-CH | $-C_7$ |
| | | Q-CH | $C_8$ |
| | 7 | I-CH | $C_5$ |
| | | Q-CH | $-C_6$ |

FIG. 24D

| | $N_{pilot} = 8$ | | | | $N_{pilot} = 16$ | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Symbol # | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Slot #1 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 10 |
| 2 | 11 | 00 | 11 | 10 | 11 | 00 | 11 | 10 | 11 | 11 | 11 | 00 |
| 3 | 11 | 01 | 11 | 01 | 11 | 01 | 11 | 01 | 11 | 10 | 11 | 00 |
| 4 | 11 | 00 | 11 | 00 | 11 | 00 | 11 | 00 | 11 | 01 | 11 | 10 |
| 5 | 11 | 10 | 11 | 01 | 11 | 10 | 11 | 01 | 11 | 11 | 11 | 11 |
| 6 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 01 | 11 | 01 |
| 7 | 11 | 11 | 11 | 00 | 11 | 11 | 11 | 00 | 11 | 10 | 11 | 11 |
| 8 | 11 | 10 | 11 | 00 | 11 | 10 | 11 | 00 | 11 | 10 | 11 | 00 |
| 9 | 11 | 01 | 11 | 10 | 11 | 01 | 11 | 10 | 11 | 00 | 11 | 11 |
| 10 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 00 | 11 | 11 |
| 11 | 11 | 01 | 11 | 01 | 11 | 01 | 11 | 01 | 11 | 11 | 11 | 10 |
| 12 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 00 | 11 | 10 |
| 13 | 11 | 10 | 11 | 00 | 11 | 10 | 11 | 00 | 11 | 01 | 11 | 01 |
| 14 | 11 | 00 | 11 | 11 | 11 | 00 | 11 | 11 | 11 | 00 | 11 | 00 |
| 15 | 11 | 00 | 11 | 11 | 11 | 00 | 11 | 11 | 11 | 10 | 11 | 01 |

FIG. 25A

| Symbol rate | Symbol # | Channel | Corresponding word of length 15 |
|---|---|---|---|
| $N_{pilot} = 8$ | 1 | I-CH | $C_1$ |
| | | Q-CH | $C_2$ |
| | 3 | I-CH | $C_3$ |
| | | Q-CH | $C_4$ |
| $N_{pilot} = 16$ | 1 | I-CH | $C_1$ |
| | | Q-CH | $C_2$ |
| | 3 | I-CH | $C_3$ |
| | | Q-CH | $C_4$ |
| | 5 | I-CH | $C_5$ |
| | | Q-CH | $C_6$ |
| | 7 | I-CH | $C_7$ |
| | | Q-CH | $C_8$ |

FIG. 25B

| | $N_{pilot} = 8$ | | | | $N_{pilot} = 16$ | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Symbol # | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Slot #1 | 11 | 00 | 00 | 10 | 11 | 00 | 00 | 10 | 11 | 00 | 00 | 10 |
| 2 | 11 | 00 | 00 | 01 | 11 | 00 | 00 | 01 | 11 | 10 | 00 | 10 |
| 3 | 11 | 11 | 00 | 00 | 11 | 11 | 00 | 00 | 11 | 10 | 00 | 11 |
| 4 | 11 | 10 | 00 | 01 | 11 | 10 | 00 | 01 | 11 | 00 | 00 | 00 |
| 5 | 11 | 11 | 00 | 11 | 11 | 11 | 00 | 11 | 11 | 01 | 00 | 10 |
| 6 | 11 | 00 | 00 | 10 | 11 | 00 | 00 | 10 | 11 | 11 | 00 | 00 |
| 7 | 11 | 10 | 00 | 10 | 11 | 10 | 00 | 10 | 11 | 01 | 00 | 11 |
| 8 | 11 | 10 | 00 | 11 | 11 | 10 | 00 | 11 | 11 | 10 | 00 | 11 |
| 9 | 11 | 00 | 00 | 00 | 11 | 00 | 00 | 00 | 11 | 01 | 00 | 01 |
| 10 | 11 | 01 | 00 | 10 | 11 | 01 | 00 | 10 | 11 | 01 | 00 | 01 |
| 11 | 11 | 11 | 00 | 00 | 11 | 11 | 00 | 00 | 11 | 00 | 00 | 10 |
| 12 | 11 | 01 | 00 | 11 | 11 | 01 | 00 | 11 | 11 | 00 | 00 | 01 |
| 13 | 11 | 10 | 00 | 11 | 11 | 10 | 00 | 11 | 11 | 11 | 00 | 00 |
| 14 | 11 | 01 | 00 | 01 | 11 | 01 | 00 | 01 | 11 | 10 | 00 | 01 |
| 15 | 11 | 01 | 00 | 01 | 11 | 01 | 00 | 01 | 11 | 11 | 00 | 11 |

FIG. 25C

| Symbol rate | Symbol # | Channel | Corresponding word of length 15 |
|---|---|---|---|
| $N_{pilot} = 8$ | 1 | I-CH | $-C_3$ |
| | | Q-CH | $C_4$ |
| | 3 | I-CH | $C_1$ |
| | | Q-CH | $-C_2$ |
| $N_{pilot} = 16$ | 1 | I-CH | $-C_3$ |
| | | Q-CH | $C_4$ |
| | 3 | I-CH | $C_1$ |
| | | Q-CH | $-C_2$ |
| | 5 | I-CH | $-C_7$ |
| | | Q-CH | $C_8$ |
| | 7 | I-CH | $C_5$ |
| | | Q-CH | $-C_6$ |

FIG. 25D

| Parameters | Uplink |
|---|---|
| Number of slots per frame | 15 |
| Number of bits in the DPCCH (Pilot/TPC/TFCI/FBI) | 6/2/2/0 |
| Number of bits in the DPDCH per each slot | 10 |
| Spreading factor (DPDCH) | 256 |
| Spreading factor (DPCCH) | 256 |
| Modulation | HPSK |
| 3dB bandwidth | 3.84MHz |
| Shaping filter | Root raised cosine (roll off 0.22) |
| Power amplifier | Ideal |
| Propagation channel | AWGN |

FIG. 26A

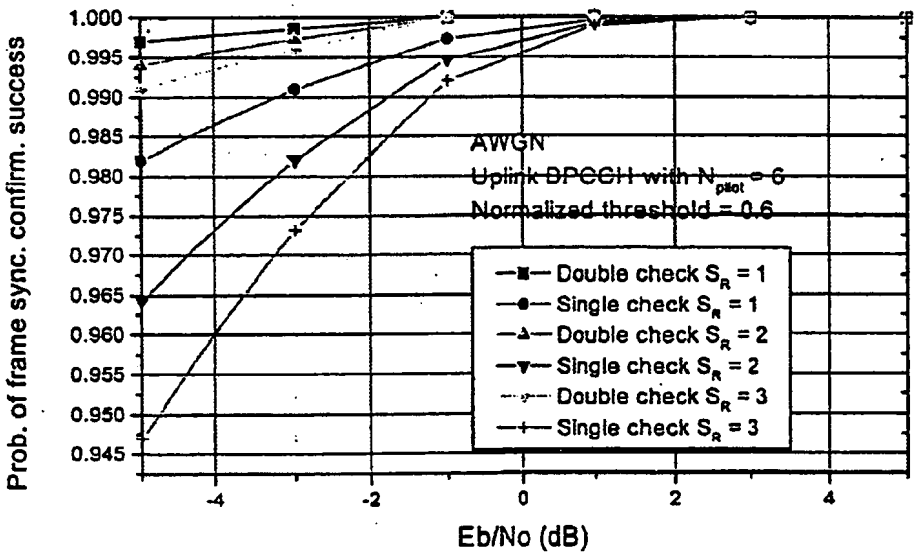



FIG. 26B

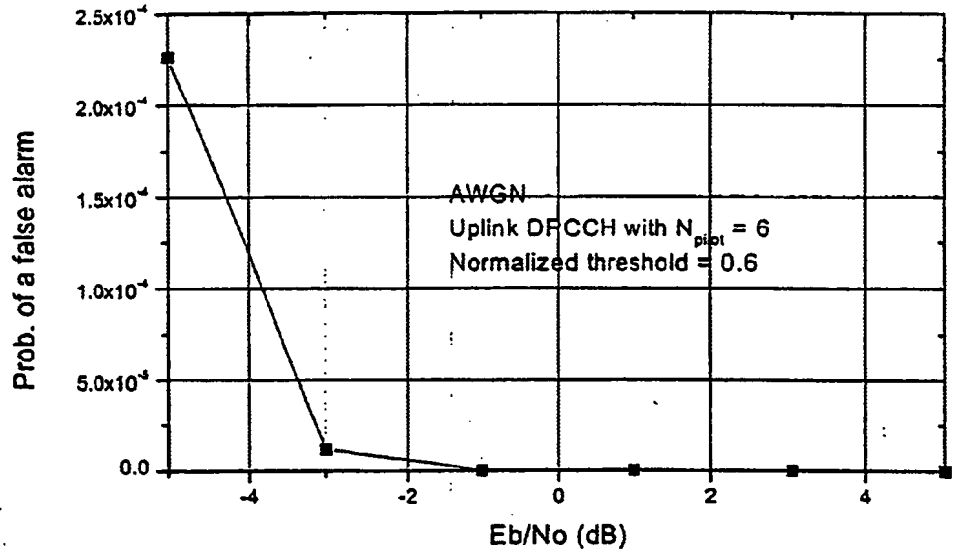



FIG. 26C

# FIG. 27

| Item | 15 slots | 16 slots |
|---|---|---|
| No. of slots per frame | 15 | 16 |
| No. of $N_{pilot}$ per slot | 1) Uplink<br>2, 3, 4, 5, 6, 7, 8<br>2) Downlink<br>2, 4, 8, 16 | 1) Uplink<br>5, 6, 7, 8<br>2) Downlink<br>4, 8, 16, 32 |
| Slot-Slot possible ? | Yes | Yes |
| Double-check possible? | Yes<br>(Two correltors such as auto-correlator and cross-correlator are used) | Yes<br>(Auto-correlator) |
| Single frame synchronization word can be used for frame synchronization ? | Yes since a frame synchronization word has –1 out-of-phase coefficients. | May not be feasible because of +4 or –4 out-of-phase coefficients. The +4 or –4 side lobes can be zero through some particular processing using preferred pair of frame synchronization words. |
| Frame syncrhonzation words | All 8 frame synchronization words are made out of a single PN code | All 8 frame synchronization words have<br>+4 or –4 out-of-phase coefficient and minus peak value at middle shift. |
| Autocorrelation function | $R(\tau)=15$, $\tau=0$<br>$R(\tau)=-1$, elsewhere | $R(\tau)=16$, $\tau=0$<br>$R(\tau)=-16$, $\tau=8$<br>$R(\tau)=0,+4$, or $-4$, elsewhere |
| | | |